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NORTHEASTERN UNIVERSITY

Undergraduate Catalog
Full-Time Day Programs
1994 | 1995



Northeastern University

**Undergraduate Catalog
Full-Time Day Programs**

1994–1995

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*Courses in Health, Sport, and Leisure Studies are administered through the Bouvé College of Pharmacy and Health Sciences. Students matriculated for a degree in this area prior to the time of consolidation may, until June 1997, opt to receive the degree from the Bouvé College of Human Development Professions.

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The University

Admissions

Learning about Northeastern

The Department of Undergraduate Admissions encourages prospective students to learn more about Northeastern University. For more information on the following programs, or to receive additional publications, contact the department at 617-373-2211 (voice), 617-373-4019 (TTY), or 617-373-8780 (fax). Or write: Department of Undergraduate Admissions, 150 Richards Hall, Northeastern University, Boston, Massachusetts 02115.

Information sessions. These sessions are scheduled on Monday through Friday year round (except for legal holidays). They include presentations by an admissions counselor, an informal question-and-answer period, and a multimedia presentation. The sessions are also held on Saturday mornings in the fall and spring.

Interviews. All prospective students are encouraged but not required to schedule a personal interview. The interview allows students to meet with an admissions counselor and to learn more about the University's academic and cooperative education programs.

Guided tours. Student-guided tours of the campus are held Monday through Friday and on Saturday mornings in the fall and spring. During July and August tours are held on Monday through Friday. Tours begin at 9:00 AM and leave on the hour, with the final tour at 3:00 PM. Both the admissions information session and the tour may be scheduled in advance by contacting the admissions department.

College visit program. Prospective students and their parents have the opportunity to visit any one of the undergraduate colleges and schools through the college visit program. Visits are scheduled so that prospective students and their parents may participate in the information session and university tour on the same day.

Open houses. During late winter and early spring, each of Northeastern's undergraduate colleges invites prospective students and their parents to an open house. Representatives of various University departments provide information about admissions, cooperative education, financial aid, residential life, student activities, and the University libraries, among other areas.

Admissions Policies

Northeastern University admits qualified freshmen and transfer students to all programs in September and January. In most programs, transfer students also may apply for entrance at the beginning of the March and June quarters.

Rolling admission. Decisions on admission are made as soon as all of the required credentials (including first marking-period senior grades and College Board or ACT test scores) have been submitted and reviewed. In all cases of acceptance, candidates must complete their senior year of high school. Admission is selective and priority is given to candidates who apply by March 1.

Early admission—juniors, second-semester seniors. In certain cases, students may enroll at Northeastern before graduating from high school. Such students may enroll in either September or January, thereby reducing by one year the time to complete degree requirements. The endorsement of the student's school principal or guidance counselor is required for early admission.

Deferred admission. Accepted students who wish to participate in the deferred admission plan will be asked to describe the activities they plan for the year preceding enrollment. Students may choose this plan for reasons such as travel, health problems, or work. Students granted deferred admission will be required to place a \$200 tuition deposit to secure their position.

Required deposits. Students who are accepted to the University are asked to submit a nonrefundable tuition deposit of \$200 by May 1. This deposit indicates intent to enroll and is applied to the first-quarter tuition account. Students applying for entrance dates other than September should note the required deposit date on their certificates of acceptance. For additional information about deposits required for international students, refer to the International Students section on page 4.

Students interested in on-campus housing must submit a nonrefundable \$400 deposit (in addition to the \$200 tuition deposit) along with a completed housing application form. Information about this required nonrefundable deposit is mailed by the Department of Residential Life to all admitted students following acceptance.

Entrance Requirements

Ideally, applicants have completed an academically challenging secondary school program—one that includes courses in English, mathematics, laboratory science, history, and a foreign language. Candidates should also have read broadly outside of class and developed an ability to communicate ideas effectively. Achievement in secondary school is the best single predictor of academic success in college. This factor, together with recommendations from the student's school counselor, and Scholastic Assessment Test (SAT) or American College Testing Program (ACT) test results, weigh most heavily in the evaluation process.

Secondary School Preparation

Arts, humanities, and social sciences. Students who plan to major in art, theatre, English, foreign languages, music, philosophy, and speech communication should have demonstrated ability in these areas during high school. Candidates who plan to pursue careers in anthropology, economics, history, human services, linguistics, political science, psychology, or sociology should have a well-rounded background in the social sciences. Applicants to the School of Journalism should have worked on writing and producing high school publications or audio- or videotape productions.

Students seeking certification as teachers in early childhood education or elementary education or those planning to major in human services should have demonstrated interest in the behavioral, social, and human sciences.

Business administration. Candidates must have completed a strong preparatory program that emphasized the humanities, social sciences, and natural sciences. Applicants also must have had several years of mathematics, including geometry and Algebra 1 and 2.

Computer science, engineering, mathematics, nursing, pharmacy and health sciences, and sciences. Applicants are encouraged to complete a full sequence of science and mathematics courses. In science, such a sequence usually includes a year of study and laboratory work in biology, chemistry, and physics; and, in mathematics, the sequence includes geometry, Algebra 1 and 2, and a fourth year of trigonometry and/or analysis. Math and science majors also need courses in the social sciences and humanities.

Criminal justice. Applicants should have demonstrated the ability to succeed in their study of the behavioral, social, and human sciences.

Engineering technology. Applicants are encouraged to complete a full sequence of mathematics, including geometry, Algebra 1 and 2, and analysis; and a full year of study and lab work in a natural science. Candidates also need courses in the social sciences and humanities.

Entrance Examinations

Freshmen must take the Scholastic Assessment Test (SAT) of the College Board or the American College Testing Program (ACT). Results of these tests may be sent directly to the admissions office. The College Board code number for Northeastern University is 3667. When evaluating candidates the admissions office will consider the two best scores a student submits, regardless of test date. For more information, consult a school guidance counselor or write directly to The College Board, P.O. Box 592, Princeton, NJ 08540 or P.O. Box 1025, Berkeley, CA 94701. Or write to American College Testing Program, P.O. Box 168, Iowa City, IA 52243.

English-as-a-Second-Language Proficiency Requirement

Before being considered for admission, students whose native language is not English are required to demonstrate some English language proficiency. This can be done by submitting the results of the College Board's Test of English as a Foreign Language (TOEFL), or by successfully completing an approved English-as-a-second-language course of study.

Before they are allowed to enroll in academic coursework, all students whose first language is not English and who score below 550 on the TOEFL (or its equivalent on another examination) must take the English Proficiency Test administered by the University's English Language Center. The results of this test are used to assign students to appropriate English courses.

Advanced Placement

The University grants advanced placement credit to applicants with a score of 3 or better in their advanced placement examinations. Applicants may take the tests in art (history, studio—general, studio—drawing), biology, chemistry, computer science (A, AB), economics (microeconomics, macroeconomics), English (language, literature), French (language, literature), German (language), government and politics (comparative, United States), history (European, United States), Latin (Virgil, Catullus—Horace), mathematics (calculus AB, BC), music (theory), physics (B,C mechanics—C electricity, magnetism), and Spanish (language, literature). Applicants who wish to submit scores for advanced placement are required to take the Advanced Placement Tests of the College Board in May.

College-Level Examination Program

The University cooperates with the College Board in its College-Level Examination Program. CLEP provides a national program to evaluate nontraditional college-level education. Northeastern will grant college credit to qualified students according to their CLEP scores. Northeastern is a designated CLEP Testing Center. For more information, contact the Counseling Center at 302 Ell Student Center, 617-373-2142.

Health Requirements

The Lane Health Center's Pre-entrance Physical Examination Form is sent to each student following acceptance at Northeastern. Completion of this form is considered a condition of enrollment. Each student must return the completed form, which includes a medical history, documentation of a recent physical exam, and a tuberculin test, within six months of registration.

State law requires medical documentation of appropriate immunization against measles (two vaccinations), mumps, rubella, tetanus, and diphtheria. Both a rubella and a varicella titre are mandatory for the health professions (medical laboratory science, nursing, pharmacy and health sciences, radiology, and physical therapy). Tuberculin tests are required annually for nursing students and within three months prior to the practicum for student teachers. A positive titre for Hepatitis B is required prior to beginning any clinical assignments, internships, or cooperative education quarters for all undergraduate students deemed at risk by their departments and in pharmacy and health sciences and nursing.

In accordance with Section 504 of the Rehabilitation Act of 1973, applications for admission are judged on the basis of qualification, not on the absence or presence of a medical or disabling condition. Any adjustments needed for such applicants are made to ensure access to college life, both academic and extracurricular.

How to Apply
All Students

The application process for all students follows. Refer to the International Students section and the Transfer Students section for additional requirements.

- Complete and sign the application form.
- Enclose the nonrefundable \$40 application fee. Make checks payable to Northeastern University. This fee may be waived in cases of extreme hardship as endorsed by the candidate's secondary school counselor or social worker.
- Mail the application form and the check to the Department of Undergraduate Admissions, 150 Richards Hall, Northeastern University, Boston, Massachusetts 02115.
- Arrange for transcripts and required test scores—Scholastic Assessment Test (SAT) or American College Testing Program (ACT)—to be sent to the University. (Transfer students who have completed two years of college do not have to submit test scores.)
- For priority consideration, applications should be submitted by March 1.

International Students

The University welcomes qualified students from other countries. At present, nearly 2,500 international students from more than 115 countries attend Northeastern. The University is authorized under federal law to enroll nonimmigrant aliens as full-time students in degree-granting programs.

In addition to the application process described above, international students must complete the following.

- Submit the Supplementary Form for International Applicants, according to the following schedule.

Entrance date	Application deadline
Fall quarter (freshmen and transfer students)	March 1
Winter quarter (freshmen and transfer applicants)	September 1

- Submit the same credentials as U.S. citizens. All credentials must be official documents or certified true copies. Credentials in languages other than English must be accompanied by certified literal English translations. Applicants with previous university-level studies should submit official course descriptions or syllabi for all coursework completed.
- Demonstrate English language proficiency if their first language is not English. See page 3 for details about fulfilling this requirement.
- After acceptance, submit the required tuition deposit of \$200 and the University's Declaration and Certification of Finances Form by the date specified on the acceptance certificate. Upon receipt and approval, a Certificate of Eligibility (I-20 form or IAP-66 form) will be issued.
- If students are transferring to Northeastern from another college or university in the United States, one of the following is required. Students returning home before entering Northeastern must re-enter the United States on the I-20 or IAP-66 issued by the University. Students not returning home must present the Northeastern-issued I-20 or IAP-66 to the International Students Office during registration and orientation.

The University considers awarding advanced standing credit to students whose secondary-school education exceeds the requirements met by students in the American educational system. The University recognizes the advanced level of academic preparation offered by the International Baccalaureate. Up to one year of credit is generally granted for scores of 5, 6, or 7 on higher-level examinations, as applicable to the degree being pursued.

Transfer Students

Students who have completed one or two years of study in an accredited college, university, or technical institute or have earned an associate's degree from an accredited junior college or other two-year program may seek admission as an upperclass student.

Transfer students may request advanced standing credit as upperclass students on the basis of acceptable credits earned in an accredited two- or four-year institution or a technical institute.

Basic requirements. Transfer applicants must have achieved a satisfactory college record—appropriate to the course of study they wish to pursue—at another institution. Credit is generally granted toward a Northeastern degree for a grade of C (2.0) or better in any reasonably equivalent course completed at another accredited institution. Candidates must be in good standing and must be eligible to continue in the institution they are currently attending.

Northeastern University uses the quarter calendar and awards quarter hours of credit for courses that are successfully completed. Each quarter hour (QH) of credit is equivalent to three-quarters of one semester hour. Most Northeastern courses are equivalent to three semester hours of credit or four quarter hours. Students who successfully complete 48 quarter hours generally qualify for sophomore standing, 80 for middler, 112 for junior, and 148 for senior. All upperclass course selection for transfer students is planned with their faculty advisers.

Application procedure. Transfer applicants should follow the application process described on page 4, with the exception that the SAT or ACT is waived for students who have completed 60 semester credit hours of college work successfully. In addition, transfer candidates must

- indicate their choice of college and major on the application;
- request that an official transcript from each college attended be sent to the Department of Undergraduate Admissions directly from the registrar's office of the respective colleges;
- submit a list of courses in progress for the current academic year (including course number, course title, and number of credits to be earned in each course);
- demonstrate English language proficiency if their first language is not English. See page 3 for details about fulfilling this requirement.

The deadlines for transfer applications are:

Entrance date	Application deadline
Winter quarter	November 1
Spring quarter	February 1
Summer quarter	May 1
Fall quarter	July 1

Cooperative Education

Robert E. Vozzella, EdD, *Dean*

Candace A. Herene, BA, *Assistant Dean*

Patricia A. Venter, BS, *Diversity Coordinator*

Associate Professors

Betsey W. Blackmer, PT, EdD
 Richard L. Canale, MEd, CAGS
 Elizabeth A. Chilvers, MEd
 Kathleen L. Finn, EdD, RN
 Joyce K. Fletcher, MEd, PhD
 Mary R. Flynn, MEd, RN
 Stephen M. Kane, EdD
 Ann C. Noonan, PT, EdD
 Melvin W. Simms, EdD
 Robert R. Tillman, EdD

Assistant Professors

Michael A. Ablove, MEd
 Donald L. Eastridge, MDiv
 Ann M. Galligan, EdD
 John C. Mulhall, MS
 Veronica L. Porter, MEd
 John A. Saltmarsh, PhD
 William A. Sloane, MBA

Associate Cooperative Education Coordinators

Jean F. Egan, MEd
 Rosemarie DiMarco, MS
 Theresa A. Harrigan, EdD
 Barbara L. Lechner, MEd
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 Jill E. Lacey, MS
 Susan H. Lavoie, MEd
 Helen C. Mann, MEd
 Martha Orozco, JD
 Paula Schrank, MEd
 Jacqueline F. Sweeney, MS
 Felicia P. Wiltz, MEd
 Aaron Wizel, MS
 William E. Wray, JD
 Mark L. Yorra, RPh, MS

Cooperative education is based on the principle that what students learn in the workplace is a valuable complement to what they learn in the classroom. For most programs, cooperative education is a degree requirement. The University assists in providing relevant cooperative education experiences and attempts to integrate these experiences into the students' total academic program. The success of the program, however, ultimately depends on student interest and commitment and the cooperation of educators and employers.

Studies show that reinforcing classroom learning with job responsibilities increases a student's motivation and self-confidence. Greater interest in academic work develops when students are able to see the link between co-op experiences and classroom study. Co-op students have opportunities to evaluate career decisions early in their college years, but also to gain meaningful work experience before graduation and to establish valuable professional contacts and references. The salaries students earn in cooperative education experiences may also help defray a portion of the costs of their education.

Participation in co-op is required of all students except those in the College of Arts and Sciences. Even so, most arts and sciences students nonetheless choose to take advantage of co-op.

Cooperative education curricula leading to the baccalaureate degree generally require five years at Northeastern University. Programs typically consist of a freshman year of three consecutive quarters of full-time study followed by four upperclass years in which students alternate periods of classroom study with cooperative education experiences. The colleges of Engineering, Business Administration, and Computer Science also offer a four-year co-op option.

Responsibility for all phases of the co-op program rests with a faculty coordinator who assists students in deriving maximum benefits from their education at Northeastern. In general, co-op experiences become increasingly challenging and career-specific as students continue their education and acquire greater skills.

Students are not limited to paid employment during a cooperative period. They may wish to pursue a wide variety of experiential learning activities such as travel abroad, volunteer work, or taking specialized courses at another institution.

The Office of International Cooperative Education offers a variety of services to international students as well as U.S. citizens. Through the International Exchange Program, undergraduates may be placed abroad for their cooperative work experience. Placements abroad are currently available in the United Kingdom, Ireland, France, Spain, Germany, Austria, the Netherlands, Sweden, Australia, and Israel for students who have the appropriate background and experience.

International Cooperative Education

International students may receive assistance on matters relating to their co-op employment, such as Social Security and tax information, as well as on issues involving the verification of their immigration and co-op status. A special course, Working in the U.S., is offered to international students to help prepare them for co-op. Additionally, new opportunities may enable some international students to return to their home countries to work for American companies on co-op, especially those companies located in the Pacific Rim region.

Academic Policies

This section presents general information about what is expected of students and how progress toward matriculation is measured. For specific details on their individual degree programs, students should consult their academic advisers.

The University assumes no liability for any delay in providing or failing to provide educational or related services or facilities due to causes beyond the reasonable control of the University. Causes include, but are not limited to, power failure, fire, strikes by University employees or others, weather damage, and acts of public authorities. However, when in its judgment it is appropriate to do so, the University will exert reasonable efforts to provide comparable or substantially equivalent services, facilities, or performance; but its inability or failure to do so shall not subject it to liability.

No faculty member, administrator, or other representative of the University shall make any representations to, or enter into any agreements with, or act toward any student or other person in any manner that is not in conformity with established University policies, practices, and procedures as expressed in this or any other official University document.

Summer Orientation

Undergraduate students beginning in the fall quarter will participate in summer orientation. Summer orientation, which is required, is a valuable opportunity to prepare for a successful academic career at Northeastern University. Ten two-day, two-night sessions will be held this summer during the months of July and August. Each of Northeastern's nine colleges is assigned to specific sessions. Participants will attend a session hosted by the college to which they have been admitted. Sessions are designated as "new student" or "transfer student" sessions with each program designed to fit the needs of its participants.

The summer orientation staff includes orientation leaders, students who will serve as valuable sources of information and assistance throughout the program. In addition to the orientation leaders, staff from various campus offices and staff and faculty from your college will be available to answer questions and provide assistance in making arrangements for the fall. During summer orientation, participants will complete placement exams, meet with representatives from their college to develop a fall class schedule, register for classes, and obtain a student identification card. Participants will learn about life at Northeastern, including services and opportunities provided at the University. In addition, participants will be able to make arrangements for the fall, such as contracting for food service and campus housing. The schedule also includes opportunities to take a break, tour the campus, and participate in activities with other students. Student participants will stay in a residence hall during summer orientation. Parents, who will participate in a separate program held at the same time, will be invited to stay in a residence hall during the session. Registration information will be mailed to incoming students upon confirmation of their decision to attend Northeastern. See page 16 for summer orientation fee information.

Attendance Requirements

The University expects students to meet attendance requirements in all courses to qualify for credit. Attendance requirements vary; it is the student's responsibility to ascertain what each instructor requires.

Failure to meet attendance requirements may force a student to drop the course, as recommended by the instructor and with the approval of the Academic Standing Committee of the college.

Classes for day students are scheduled from 8:00 am to 5:10 pm, Monday through Friday. Students should not make conflicting commitments until the class schedules for each quarter are final. Schedule changes to accommodate part-time work are difficult and rarely made.

Permission to make up work may be granted by instructors for reasonable cause. Requests must be made immediately upon a student's return to class. Laboratory work can be made up only during the hours of regularly scheduled instruction.

Absence because of student activities. If students must miss classes to participate in athletic contests or other forms of scheduled intercollegiate activity, they are entitled to make-up privileges. Faculty members may require a written statement from the administrator in charge of the activity.

Absence because of illness. A student who is absent from school for an extended period of time must inform the dean of students of his or her college by letter, message, or telephone.

Absence because of religious beliefs. The University maintains the following guidelines regarding student absences because of religious beliefs. "Any student who is unable, because of his/her religious beliefs, to attend classes or to participate in any examination, study, or work requirement shall be provided with an opportunity to make up such examination, study, or work requirement

which he/she may have missed because of such absence on any particular day; provided, however, that such makeup examination or work shall not create an unreasonable burden upon such school. No fees of any kind shall be charged by the institution for making available to the said student such opportunity. No adverse or prejudicial effects shall result to any student because of availing himself/herself of the provisions of this section" (Massachusetts General Laws, Chapter 151C, Section 2B, 1985).

Absence because of jury duty. Members of the University community are expected to fulfill their obligations to serve on a jury if called upon. A student selected for jury duty should inform his or her instructors and/or activity advisers. They will provide a reasonable substitute or compensatory opportunities for any required work missed. Absence will not be penalized in any way.

Class Schedule

All classes start promptly according to the class schedule shown. Students take classes grouped in sequences, as shown in the following chart. Most of the classes at Northeastern are scheduled in the time periods listed during the fall, winter, and spring quarters.

Students may leave fifteen minutes past the scheduled opening of class if the instructor is not present. Students are expected to be punctual. Students who are late for classes should attend for the balance of the period. Instructors will not tolerate habitual tardiness.

Fall, Winter, and Spring Schedule

	Sequence 1	MWTh	8:00-9:05
	Sequence 2	MWTh	9:15-10:20
	Sequence 3	MWTh	10:30-11:35
	Sequence 4	MTTh	1:35-2:40
	Sequence 5	MTTh	2:50-3:55
	Sequence 6	MTTh	4:05-5:10
	Sequence 7	TF	8:00-9:05
		W	1:35-2:40
	Sequence 8	TF	9:15-10:20
		W	2:50-3:55
	Sequence 9	TF	10:30-11:35
		W	4:05-5:10
	Sequence 10	TWF	11:45-12:50
Business Students	Sequence A	MW	8:00-9:40
	Sequence B	W	1:45-3:25
		F	8:00-9:40
	Sequence C	MW	9:55-11:35
	Sequence D	TF	11:45-1:25
	Sequence E	TTh	1:45-3:25
	Sequence F	W	3:30-5:10
		F	9:55-11:35
	Sequence G	TTh	3:30-5:10
	Sequence H	M	3:30-5:10
		F	1:45-3:25
	Sequence I	M	1:45-3:25
		W	11:45-1:25
	Sequence J	TTh	9:55-11:35
	Sequence K	TTh	8:00-9:40

Summer Schedule

	Sequence 1	MWTh	8:00-9:05
	Sequence 2	MWTh	9:15-10:20
	Sequence 3	MWTh	10:30-11:35
	Sequence 4	MTh	11:45-12:50
		W	1:00-2:05
	Sequence 5	MTh	1:00-2:05
		W	2:15-3:20
	Sequence 6	MTh	2:15-3:20
		W	3:30-4:35
Business Students	Sequence A	MW	8:00-9:40
	Sequence B	MW	9:55-11:35
	Sequence C	TTh	8:00-9:40
	Sequence D	TTh	9:55-11:35
	Sequence E	M	1:45-3:25
		W	2:15-3:55
	Sequence G	TTh	11:45-1:25
	Sequence H	TTh	1:45-3:25
	Sequence I	TTh	3:30-5:10

Activities hours. Undergraduate activities hours are Monday and Thursday, 11:45 AM–1:25 PM during fall, winter, and spring quarters. Summer activities hours are Wednesday, 11:45 AM–12:50 PM. No classes or other academic functions are held during these hours. Violations of this regulation should be reported to the Office of the Dean of Students or to the Office of Student Government.

Grades are officially recorded by letters, evaluated as follows.

Grades	Numerical equivalent	Status
A	4.000	Outstanding achievement
A-	3.667	
B+	3.333	
B	3.000	Good achievement
B-	2.667	
C+	2.333	
C	2.000	Satisfactory achievement
C-	1.667	
D+	1.333	
D	1.000	Poor achievement
D-	.667	
F	.000	
I		Incomplete in a letter-graded course
S		Satisfactory achievement in pass/fail course; counts toward degree requirements
U		Unsatisfactory achievement in pass/fail course
W		Course withdrawal
X		Incomplete in a pass/fail course

An I or X grade shows that the student has not completed the course requirements. An average grade of D or less is not acceptable and will not allow a student to continue at Northeastern University.

Individual faculty may choose not to use plus or minus designations. If faculty elect to use only whole letters, they must announce this to the class at the beginning of the quarter.

Quality-point average. Numerical equivalents for scholastic averages are weighted according to the number of hours the course carries. For example, a grade of A in a course carrying 3 quarter hours is weighted at 12. A grade of C in a course carrying 2 quarter hours is weighted at 4. The quality-point average for both courses would then be 12 plus 4, divided by 5, or 3.2. Grades of X, I, S, and U are not included in the calculation of the quality-point average.

Credit hours. Credit hours are assigned to a course based on the established educational standard that one credit hour is equal to approximately three hours of student learning time per week over a period of a quarter, semester, or term (usually one hour of lecture or discussion, plus two hours of individual study outside class). When much individual study is involved, as in directed study or certain graduate courses, each additional hour of credit should represent at least three hours of student work.

Transfer of credits. With the approval of the academic dean a student in one of the full-time day programs may take courses in University College, the School of Engineering Technology, graduate school, or the part-time engineering program and have those courses and grades recorded on the permanent record. Degree credit may be granted for transfer work from other institutions; students should check with the Office of Freshman Affairs or the dean of their college.

Pass/fail system. The individual schools and colleges state how and when the pass/fail system may be used. An outline of the general system follows.

- Any student not on academic probation may, beginning in quarter four, register for one pass/fail course per quarter if permission is granted by the college in which the student is enrolled and if the course is offered on a pass/fail basis. Freshmen and upperclass students may take one-quarter-hour courses in physical education on a pass/fail basis in any quarter. Enrollment in these courses does not prevent upperclass students from electing an additional four-quarter-hour course on a pass/fail basis.

- Pass/fail courses are normally restricted to electives outside the major field. The college faculty, however, may choose to adopt the pass/fail system of grading when it appears pedagogically sound for required courses within a program.

- Individual faculty members may decide whether any of their courses may be taken on the pass/fail system of grading, except when uniformity is necessary. In such cases, the department and/or college faculty offering the course determine whether the pass/fail system is used.
- Grades recorded on the basis of the pass/fail system do not figure in the computation of the quality-point average. Satisfactory completion of all courses taken on the pass/fail system is designated on the student's permanent record by the letter S. Unsatisfactory work is designated by the letter U. Any unsatisfactory grade must be handled according to the existing policy of the college but must never be cleared through the election of the same course pass-fail, except when this system is the only one used by the college for grading the course.
- An incomplete in a course taken on a pass/fail basis is designated by the letter X on the permanent record and treated according to the normal procedure for incomplete grades.
- To use the pass/fail system students must meet all prerequisites for the course. They have until the end of the second week of the quarter to declare their intention to receive a pass/fail grade. This deadline may be extended to the end of the eighth week at the option of the instructor.

Quarterly status reports. Grades are mailed to students approximately three days after each quarter. A missing grade ("*" on grade report) means that none was turned in by the instructor. Take up the matter of a missing or erroneous grade directly with the instructor.

Dean's list. A dean's list, or honors list, is issued at the end of each quarter containing the names of students who have a 3.25 quality-point average or higher with no I grade or grade below C-. Students who are on any form of probation, who are enrolled in a course on a pass/fail basis (except where there is no alternative or where required by the program), or who are not carrying a full load as determined by their undergraduate college are not eligible. With a few exceptions as approved by the respective colleges, a full load is considered to be four courses or sixteen quarter hours.

Alternative-year freshmen are eligible for the dean's list when they become sophomores in one of the full-time day programs.

Procedure for clearing an I or changing other grades. An incomplete (I) grade may be reported by the instructor when a student has failed to complete a basic component of a required course, such as homework, a quiz or final examination, a term paper, or a laboratory project. Students can make up an I grade by satisfying the requirements of the instructor or, if the instructor is absent, the chair of the department. Be aware that instructors' policies on the granting of incomplete grades may vary, and that the final decision on an incomplete grade is up to the instructor. The period for clearing an I grade and for changing a grade other than an I or failure (F or U) is restricted to one calendar year from the date it is first recorded on the student's permanent record. There is no charge for this change.

Freshmen with multiple course deficiencies, including incomplete (I) grades, do not have a calendar year's time to rectify the deficiencies.

Students who make up an I grade by taking a different course or repeating the same course will be given a new grade and billed accordingly.

To clear an I grade, a student must obtain a triplicate form on which the precise agreement for clearing an incomplete (I or X) grade is specified and which is signed by the student and the instructor. Forms are available in the department office. The student must make an appointment with the instructor to arrange for clearing the I grade. He or she must then complete the form, sign the agreement, and obtain the instructor's signature; leave a copy with the instructor, take one copy to the dean's office, and retain a copy as a personal receipt.

Any exception to this policy on change of grades must be recommended by the Academic Standing Committee of the college in which the course was offered and must be forwarded in writing by the dean to the registrar for implementation. (This process must be completed within one calendar year from the end of the quarter in which the course was offered.)

Commencing with grades given in the fall quarter of 1986, the University policy has been that any grade outstanding for twelve or more months cannot be changed.

Make up of deficiencies or failures. Failure in a course may be made up in another institution. Students who wish to make up coursework should consult the dean's office for specific information about the college's transfer credit policy.

Remedial/compensatory courses. Remedial/compensatory courses are currently offered for credit through different programs and colleges. While credit for remedial courses may be given, not all colleges or departments will apply these credits to major, distribution, or graduation requirements. Students should consult their advisers for specific information.

Examinations

Final examinations are held during the last week of each quarter. An examination schedule is posted at midterm on the registrar's official bulletin board. No examinations longer than one-half hour may be given in the week before final examinations. It is the student's responsibility to know the time and location of each of his or her examinations. Final exam conflicts, defined as two exams at the same hour or three exams in one day, will be resolved with the help of the scheduling office, 120 Hayden Hall, but only if reported before the last full week of classes.

A list of rules of conduct during examinations follows.

- Students must concentrate on their own work.
- Under no circumstances may a student communicate in any way with another student during an examination.
- Each student must work in a manner that does not bother other students.
- No unauthorized material is allowed in the examination room.
- Unless otherwise specified by the instructor and so understood by the head proctor, students who bring such materials as books, notebooks, and papers into a final-examination room must leave them either at the front or rear of the room or against the walls, at the option of the head proctor.
- All written material must be kept on the right arm of the chair. (In rooms with tables, materials are to be kept in front of students.)
- Proctors cannot answer questions about the examination material; students should ask questions that concern only possible typographical errors in the text or missing parts of the examination.
- No student may leave the room during the first thirty minutes of the examination. Late students may not enter the examination room if any other student taking the examination has already departed. Late students do not get extra time.
- Material may not be borrowed during the examinations.
- Students may leave the examination room permanently after thirty minutes have elapsed, but during the last ten minutes of the examination no one will be allowed to leave the room. Students remaining until the end of the examination must cease work immediately when the head proctor announces the close of the examination and must remain quietly seated until all examination materials have been collected.
- Students who become ill during an examination and are unable to complete the examination must report to the Lane Health Center immediately.
- Students must turn in all examination materials before leaving the room unless the instructor indicates that copies may be retained.
- With permission of the instructor, students may submit a stamped, self-addressed postcard with the final examinations in order to receive grades early.

Academic Requirements

Depending on their college affiliation, freshmen must attain a final cumulative quality-point average of at least 1.4 or 1.6 (as noted in the individual college sections). They must also earn sufficient credits in order to progress into the sophomore year.

Drop back/repeating freshman status. Freshmen who fall below the 1.4/1.6 quality-point average standard and/or who have accumulated a quarter's worth or more of deficient credit (grades of F, W, I, U, X, or a missing course) are not permitted to progress with the original graduating class. Therefore, if the number of credits earned after the third quarter of the freshman year falls below the totals listed below, students may have their status changed to "repeating/continuing freshmen."

Credits that determine repeat status after third quarter	Total credits for freshman curriculum
31 or under	46
31 or under	47
32 or under	48
32 or under	49
33 or under	50
34 or under	51
34 or under	52
35 or under	53
36 or under	54
37 or under	55
37 or under	56

Students remain in repeating/continuing freshman status until quality-point average and credit requirements, as well as other college and/or major department standards for the freshman year, are satisfactorily completed.

University policy grants repeating freshman status on a quarter-by-quarter basis. Two exceptions to this policy are the College of Business Administration and Bouvé College of Pharmacy and Health Sciences, which do not grant such status at all except under extenuating circumstances. Repeating freshmen in the College of Arts and Sciences must earn a 2.0 quality-point average each quarter; repeating freshmen in the Alternative Freshman-Year Program must pass all four classes with at least a 1.4 cumulative average in their first repeated quarter. No more than three academic quarters beyond the earlier three quarters of the original freshman year are allowed for repeating freshmen.

Academic probation with eligibility for cooperative work placement. This status exists in all colleges for freshmen who complete their programs with a quality-point average of 2.0 or higher and who have more than five deficient credits but less than a full quarter's worth of deficient credits. However, students in the College of Arts and Sciences who have less than a 2.0 quality-point average after the freshman year are on academic probation even if they earn all the credits associated with their particular major.

Academic probation without eligibility for cooperative work placement. Sophomores in all colleges are assigned this status if their freshman quality-point averages range from either 1.40 or 1.60 through 1.99 and if they have six through thirteen deficient credits. They remain on academic probation as sophomores in Division N until all sophomore and freshman make-up courses have been completed satisfactorily.

Academic eligibility for participating in student organizations. All students must have a minimum 2.0 overall grade point average in order to be eligible for an elected or appointed leadership position in any student organization.

Repeating classes to clear deficiencies. Students may, with approval, repeat a course or take a substitute course in the full-time day program to clear a deficiency. The final grade for this course replaces the former grade. Students who are repeating courses outside the full-time day program to raise their quality-point average or to clear a deficiency must attain an average of 2.0 in all repeated work.

Graduation Requirements

To be eligible to receive degrees, graduating students must clear all academic, financial, cooperative work, or disciplinary deficiencies. See individual programs for specific academic requirements for graduation.

Attendance at commencement is optional. Information concerning commencement is mailed to all graduating students during the spring quarter for June graduation or summer quarter for September graduation.

Seniors are notified by mail if they fail to qualify for their degrees. No special notice is sent to those who do qualify. Students who are in doubt should call their dean's office. The University has a residency requirement of a minimum of three full-time quarters at Northeastern immediately preceding graduation.

Graduation with honor is reserved for students who have attended a minimum of six full-time quarters and who have achieved quality-point averages as follows.

Quality-point average	Honor conferred
3.25–3.49	Graduation with honor (<i>cum laude</i>)
3.50–3.74	Graduation with high honor (<i>magna cum laude</i>)
3.75–4.00	Graduation with highest honor (<i>summa cum laude</i>)

Registration Procedures

Course prerequisites. Students are expected to meet prerequisites as listed in the course description of each course in which they enroll. Grades of F, U, I, X, or W in prerequisite courses do not normally fulfill requirements. Exceptions must be authorized by the academic department offering the course and be approved by the office of the dean of the student's college.

Declaring majors and minors. Undergraduate students generally declare their majors upon admission to the University or in the spring quarter of their freshman year. Majors are described under the various schools and colleges. Students may earn a minor in any undergraduate discipline that designates a minor. Students should declare their intent to earn a minor as early as possible, and no later than the end of the junior year, by applying to the minor department. During the final term, the department offering the minor ensures that it appears on the student's academic record shortly after graduation by informing the registrar of the completion of the minor.

Internal and external transfer students. To transfer to another college within Northeastern University or to change majors within the same college, students should contact the appropriate office for their academic level. Freshmen and upperclass students should consult the office of the dean of the college to which they want to transfer. A transfer to another college is not automatic but is based on a number of factors, including academic achievement and availability of space.

External transfer students are those who previously attended a college other than full-time day college at Northeastern. At the time of their admission, external transfers are identified as either freshmen with advanced standing or upperclass transfer students. Freshmen with advanced standing are those accepted with less than the equivalent of thirty-six quarter hours of transfer credit. They are included in the freshman class in quarter one, two, or three.

Upperclass transfer students have been accepted into a full-time day college with enough transfer credit to enable them to enter as sophomores, middleclass, or juniors. Programs for upperclass transfers are generally planned with advisers in the offices of the department and dean.

Special students. Students not regularly enrolled in a full-time day college may, in certain instances, enroll on a quarter-by-quarter basis in some courses given in those colleges. Approval and further information must be obtained from the dean of the college offering the specific course.

Overload (additional course) policies. Upperclass students taking a full course load may take an additional enrichment course without charge. No credit is given for this course. Students wanting to take an additional course should confer with the dean or his or her designee to establish eligibility. The additional course must be a four-quarter-hour full-time day college course; the only such tuition-free course during the upperclass academic year; in addition to the normal course load for the quarter; and on a space-available basis on registration day, with priority given to tuition-paying students. The course does not contribute to fulfilling degree requirements or to the calculation of the quality-point average or total earned hours. After students have filled out and signed the necessary form, they must take the appropriate copy to the Office of the Registrar no later than the second week of the quarter.

Should students later petition to have credits earned in this course apply to their degree, they must obtain the approval of the dean or his or her designee, pay tuition at the rate current at the time of petition, and complete the process by May of their senior year.

Any student who registers for more quarter hours in a quarter than an existing curriculum allows is liable for the extra charges.

Students may withdraw from a course up to the eighth week. They can receive a refund or credit on a prorated basis if they drop a course between the first and fourth weeks of the quarter. However, no rebate or credit is granted when they voluntarily drop a course beyond the fourth week. Students who enroll in overload courses to clear failures or other deficiencies (W or I) are billed at the overload rate, one-sixteenth the tuition for that quarter, per quarter hour.

Division conflicts. Students who are in the wrong division for a given quarter will be purged from all preregistered courses for that quarter unless their division assignment is correct on month prior to the start of that quarter. Students must contact their college dean's office and/or Cooperative Education to correct their status.

Dropping courses. To drop a course, students must first obtain a course drop form at the registrar's or college dean's office. Not attending a class does not constitute withdrawal. Students must fill out the course drop form and have it signed by their instructor and by a representative of either their college dean or the department that offers the course. After obtaining all required signatures, students must return the original copy to the Office of the Registrar and keep a copy for themselves.

Course withdrawals are permitted through the third week of the quarter without any grade recorded on the permanent record. Course withdrawals at any time during the fourth through the eighth week of the quarter are indicated by a W on the record. After the eighth week, no withdrawals are accepted for any reason. At this point, a letter grade is posted on the record. A faculty member may choose not to sign a course withdrawal form if the student was involved in any kind of academic dishonesty in the class.

Change of name. Report all name changes to the Office of the Registrar immediately. This is especially important when students marry and wish to use a new name on University records.

Change of address. Notify the Registrar, Bursar, or Financial Aid promptly of any address change. Both the permanent home address and the local address are needed.

Transcripts. To obtain an official transcript, students (and alumni/ae) must send a check in the amount stipulated by the Office of the Bursar, mailing instructions, and a disclosure waiver, if necessary, to the assistant University registrar at 117 Hayden Hall. To request a transcript in person, first obtain an official receipt from the Office of the Cashier at 248 Richards Hall; then present the receipt and a valid photo ID at 117 Hayden Hall. Telephone requests are not accepted. You can obtain unofficial transcripts in person only by presenting a valid photo ID at 117 Hayden Hall.

Withdrawal from the University. Students seeking to withdraw from the University for any reason should begin the process at the appropriate office for their academic level. Students should contact the office of the dean of their college. Students wishing to transfer should consult the dean's office for their school or the Office of the Dean of Students.

Students may be withdrawn from the University for financial, disciplinary, academic, or health reasons. In the last case, a committee will review the recommendations of the director of health services to determine whether the student should withdraw. The student has an opportunity to present his or her case to the committee. Withdrawals are made only when it is determined that the student is a danger to himself or herself or to other members of the University community, or when the student has demonstrated behavior detrimental to the educational mission of the University.

Procedures for student leave of absence for medical reasons. After the eighth week of the quarter students may withdraw from course work (leave of absence) only for medical reasons. A student taking a leave of absence from academic work for medical reasons must contact the dean's office of his or her college. Medical reasons are considered to include both physical and emotional well-being. A representative of the dean's office will discuss the situation with the student and refer the student to the Lane Health Center with a petition form. The petition for a medical leave of absence must be made prior to the end of the quarter. The student's physician must provide appropriate medical information to the Lane Health Center physician. A student who is on co-op when he or she needs a medical leave of absence must contact the co-op coordinator.

A medical leave of absence may be effective for up to six months. During this period the student maintains all the rights and responsibilities of a Northeastern University student. If the student is covered under the Northeastern-sponsored Blue Cross/Blue Shield insurance, it remains in effect. After six months the student must obtain re-entry or be withdrawn from the University.

When the student is ready to return to the University, he or she must again contact the appropriate college representative, who in turn refers the student to the Lane Health Center. The center must be provided with medical documentation validating the treatment and the student's fitness to return to school. Strict confidentiality is maintained in all aspects of medical leaves of absence. Exceptions to these procedures are handled by the appropriate academic standing committee.

College Expenses

All students registered in a full-time day college are charged full tuition for coursework of twelve quarter hours or more. In addition, charges are made for coursework beyond the normal academic schedule. Students should note that the freshman year consists of three quarters of full time study. The co-op program does not begin until sophomore year.

A number of payment plans and financial aid and scholarship programs are available to help students meet college expenses. For information, contact the Office of Financial Aid, 356 Richards Hall, 617-373-3190.

Tuition is paid in installments at the beginning of each quarter. Tuition for freshmen is computed by the year and paid in three equal installments or on the schedule provided for in one of several payment plans available at Northeastern. Freshman payment deadlines are August 29, 1994; December 12, 1994; and March 21, 1995. Deadlines for January enrollees are December 12, 1994; March 21, 1995; and June 13, 1995.

Payment deadlines for upperclass students are by division. Division B: December 12, 1994, and June 13, 1995; Division A: September 12, 1994, and March 21, 1995; Division C (those who are temporarily or permanently on a noncooperative plan year): September 12, 1994; December 12, 1994; and March 21, 1995.

The following chart estimates the annual costs for most students. Costs vary with the year and program of study. Tuition rates, room and board charges, and fees are subject to revision by the Board of Trustees at any time. In addition to the costs listed below, students should estimate costs for supplies, personal expenses, and transportation. If a student defaults on tuition and/or residence payments, he or she shall be liable not only for the outstanding balance, but also for reasonable collection costs and attorneys' fees incurred by the University in collecting unpaid balances.

1994-1995 Tuition

College/school/program	Freshmen	Upperclass students
	(3 quarters)	(2 quarters)
Business	\$13,380	\$12,360
Computer Science	\$13,380	\$12,360
Engineering	\$13,380	\$12,360
Engineering Technology	\$13,380	\$12,360
Arts and Sciences	\$13,380	\$11,550
Criminal Justice	\$13,380	\$11,550
Journalism	\$13,380	\$11,550
Nursing	\$13,380	\$11,550
Pharmacy and Health Sciences	\$13,380	\$11,550
Alternative Freshman-Year	\$13,380	
Physical Therapy	\$13,380	\$12,060

The following fees are required of all students.

Application fee. This nonrefundable \$40 fee must accompany an application for admission.

Tuition deposit. A nonrefundable tuition deposit of \$200 applied to the first quarter tuition account is due by May 1 from all students entering in September. Students entering at other times of the year should note the required deposit date on their certificates of acceptance.

Summer orientation fees. Summer orientation materials will be mailed to incoming students upon receipt of their tuition deposit. The summer orientation is a mandatory program for all new and transfer students beginning in the fall quarter. A non-refundable fee of \$125 must accompany the student registration for summer orientation. This fee covers all orientation program materials, meals, and housing. Students can contact the Office of New Student Orientation and Commuter Services if they seek to make payment arrangements for their summer orientation fee due to financial considerations. Each parent and family member who will attend the parent/family summer orientation program must also include a non-refundable fee of \$100 with their registration.

Student services fee. Students pay a \$50 quarterly student center fee to support the Ell Student Center and a \$12 quarterly student activities fee to support student clubs.

Photo-identification card. This \$2 card is issued to new full-time students at orientation and registration. Students must have a properly validated card to use most University facilities. A replacement card costs \$5.

University health insurance. The University provides hospital insurance and a student health program for all students who have matriculated, carry a course load of nine credits or more, or are enrolled in a full-time program. This program is mandated by the Commonwealth of Massachusetts.

Students who are covered under a comparable hospital insurance plan may waive the University-offered insurance program by filing a waiver available at the Bursar's Office.

Sports pass fee. This \$45 fee (\$25 if student begins classes in winter quarter) allows students to attend all regular home games without additional charges.

Other fees may include the following.

Housing deposit. New students seeking on-campus housing must submit a nonrefundable \$400 deposit along with a completed housing application form to complete the housing application process. The upperclass housing deposit is \$75 per quarter.

Residential infirmary fee. All on-campus residents pay a quarterly \$25 fee for the use of the Lane Health Center Infirmary.

Residence hall activities fee. All students living in the residence hall system pay a quarterly \$15 fee for activities sponsored by the Residence Student Association and the hall governments.

Deferred tuition payment fee. Northeastern University offers a three-payment option available prior to the first week of classes. Information regarding this plan, which is administered by Tuition Management Systems, may be obtained by calling 1-800-356-0350. There is a nominal fee for participation in this program.

Late payment fee. Failure to make payments in accordance with the prescribed regulations results in a \$200 fee.

International student fee. The one-time fee of \$200 is charged to new undergraduate international students, payable after their acceptance at Northeastern.

Laboratory deposits. Students taking laboratory courses purchase laboratory deposit cards from the Office of the Cashier as directed by the department offering the course. These deposits cover any breakage of laboratory apparatus.

Liability insurance. Students in most health profession programs, such as nursing, pharmacy, and respiratory therapy, are required to pay a liability insurance fee of \$18.

Room and Board

At the beginning of the first quarter, all entering freshmen living in University residence halls will be billed for the nineteen meals per week option (\$1,145). Once on campus, freshmen may select either a ten or fifteen meal plan option.

Returning upperclass students must apply for housing each quarter.

Traditional Residence Halls

	Single	Double	Triple
Kerr Hall	\$1,480	\$1,290	
Light Hall	\$1,480	\$1,290	\$1,210
Melvin Hall	\$1,480	\$1,290	\$1,210
Smith Hall	\$1,480	\$1,290	\$1,210
Speare Hall	\$1,480	\$1,290	
Stetson West	\$1,480	\$1,290	
Stetson East	\$1,480	\$1,290	
Northeastern At The Y	\$1,300		
<i>Suites</i>			
Kennedy Hall	\$1,480	\$1,290	
153 Hemenway	\$1,480	\$1,290	\$1,210

Apartments

	Single	Double	5-Bedroom	6-Bedroom	8-Bedroom
Loftman Hall	\$1,925	\$1,520	\$1,465	\$1,430	\$1,350
	Single	Double	Triple	Quad	
Burstein	\$1,775	\$1,400	\$1,200	\$1,080	
Rubenstein	\$1,775	\$1,400	\$1,200	\$1,050	
St. Stephens St.	\$1,825	\$1,450	\$1,250	\$1,180	
407 Huntington	\$1,825			\$1,300	
337 Huntington	\$1,825	\$1,450			
319 Huntington	\$1,825	\$1,450	\$1,250	\$1,200	
Willis Hall		\$1,775		\$1,490	

The rates listed above are for standard room accommodations only. Rates can vary based upon adjusted capacities and room size or occupancy.

University Dining Service

All students who live in traditional University residence halls and suites are required to participate in the food plan run by University Dining Service.

Meals per week	Cost per quarter
19	\$1,145
15	\$1,035
10	\$935
5	\$455 upperclass only

University-Wide Programs

Honors Program

The University invites qualified students in each of its colleges to participate in a comprehensive honors program designed to foster high intellectual development and achievements. Based on criteria established by an individual college for its own majors, students are invited into the program as entering freshmen or as entering sophomores (based on Northeastern freshman-year grades). Other students may be recommended or express interest on their own at later points in their undergraduate careers.

Special limited-enrollment sections of many first- and second-year courses are offered for honors students. Honors seminars on interdisciplinary subjects are open to honors students. Junior/senior honors projects or courses are required of students in the program.

Honors and standard sections of courses are usually equivalent in terms of satisfying degree requirements and are distinguished by course number. For example, the honors section of ECN 1115 is ECN 1715; for PHL 1100 it is PHL 1700. An updated list of offerings is available in the honors program office and also appears in the registrar's course listings.

There are two other types of honors courses. *Honors within a standard course* are activity courses that allow students to substitute special work for some of the standard assignments within the course. *Honors outside a standard course* are adjunct courses that carry an additional one quarter-hour credit so that students receive two grades: one in the standard course and one in the honors adjunct. This one quarter-hour course may be taken only with another standard course and represents the enriched work that makes the entire five quarter-hour honors course. Activity and adjunct courses only appear on the listing in the honors program office. Because they do not carry separate numbers, activity and adjunct courses do not appear as honors-level in the registrar's course listings. Honors courses may be taken as a free overload. Criteria for free overloads are available in the honors program office.

The honors program also sponsors extracurricular cultural and recreational activities. Students may choose special honors housing in 115-119 Hemenway Street and/or use the honors lounge, study room, and computer room in 1 Nightingale Hall.

For more information on honors courses, on how to qualify to take courses, and on other aspects of the program, contact the honors program at 617-373-2333 or drop by 1 Nightingale Hall.

Honors Scholarships

Ambassador Awards. The University offers five half-tuition scholarships for exceptional academic achievement to non-U.S. citizens for the freshman year (September through June). The Ambassador Awards are given to freshmen enrolled in a full-time day academic program and are not renewable.

Carl S. Ell Presidential Scholarship Program. This program was established to recognize some of the University's finest incoming students and to foster the continuation of their superior academic performance.

Each year a limited number of freshmen who have records from high school that exhibit exceptional promise are selected for this academic achievement award. Criteria for selection include high school records indicating a college preparatory program, class rank, grade-point average, extracurricular activities, community service, letters of recommendation from guidance counselors, and SAT or ACT test scores.

The Ell Scholars effective with the Class of 1998 are awarded full tuition scholarships for their freshman year. Those who continue to maintain a superior scholastic average will have their scholarships renewed at the full tuition level in subsequent years. The Class of 1998 also receives full room, board, and fees plus stipend for one international cooperative education internship. Awardees must reside on campus and maintain enrollment in the Honors Program.

Students in the classes of 1994-1997 who have maintained a superior scholastic average will also receive full tuition scholarships, but they do not receive the room, board, fees or international cooperative education internship stipend.

In addition to the awarding of financial assistance, the scholars are provided with a number of opportunities to engage in intellectual exchange on campus.

The application deadline is January 1. Carl S. Ell recipients must follow procedures to receive state and/or federal education grants to which they may be entitled.

Dr. Ralph J. Bunche Scholars Program. Northeastern honors the late Dr. Ralph J. Bunche, Nobel laureate and former undersecretary of the United Nations, by awarding ten scholarships annually to African-American students who have outstanding records of academic achievement and leadership.

Compensatory Courses

Compensatory courses in English and mathematics are for freshman native speakers of English whose reading, writing, and/or mathematical skills need strengthening.

The University uses one or more of three criteria to determine which freshmen participate in the compensatory programs: pre-college academic credentials, tests administered during orientation week, or performance in ENG 1110, Freshman English 1.

In general, the program consists of five courses, each offering four hours of credit. The courses must fit into the following sequences.

Fall*

MTH 1000	Mathematical Preliminaries 1
ENG 1110	Freshman English 1†
or	
ENG 1013	Fundamentals of English 1

Winter*

MTH 1010	Mathematical Preliminaries 2
ENG 1014	Fundamentals of English 2

Please note that successful completion of Mathematical Preliminaries 1 and 2 is a prerequisite for: MTH 1101, MTH 1106, MTH 1107, and MTH 1108

MTH 1113 and MTH 1114

Nonbusiness mathematics sequence; and
Business mathematics sequence

A passing letter grade in Freshman English 1 or Intensive Writing is a prerequisite for:

ENG 1111	Freshman English 2
ENG 1111-ENG 1113	Engineering sequence
ENG 1111	Engineering technology

*The same sequence is offered winter/spring for students who enter in January.

†Students whose work in this course is unacceptable for success in ENG 1111, Freshman English 2, will receive a grade of S and must complete ENG 1014, Fundamentals of English 2.

Schedule for Continuation of Compensatory Programming

Acceptance for credit is determined by the faculties of the individual colleges and is therefore subject to change. The chart below outlines policies on compensatory courses. Asterisked (*) courses are graded pass/fail and therefore are not included in the student's quality-point average. A yes designates acceptance for credit, a no designates non-acceptance, and an n/a, not applicable.

	English 1 (ENG 1110/1013)	English 2 (ENG 1014)	Mathematical Preliminaries 1* (MTH 1000)	Mathematical Preliminaries 2* (MTH 1010)
Arts and Sciences	yes	yes	yes	yes
Business Administration	yes	yes	yes	yes
Computer Science†	yes	yes	n/a	n/a
Criminal Justice	yes	yes	yes††	yes††
Engineering†	n/a	n/a	n/a	n/a
Engineering Technology	yes	yes	n/a	n/a
Nursing	yes	yes	no	no
Pharmacy and Health Sciences	yes §	yes	no	no

†This college offers MTH 1120 and MTH 1121, a course sequence in college calculus with algebra and trigonometry, to students who test deficient in mathematics. The sequence involves extra work in algebra and trigonometry and covers the same material as the regular freshman calculus sequences.

††Students whose diagnostic examinations suggest a need for basic mathematics may elect MTH 1000 or MTH 1010 to prepare for MTH 1106, Fundamentals of Mathematics.

§This college will accept ENG 1110 or ENG 1014 for credit only with a letter grade. Students who complete English courses must still take a four-credit English elective.

ROTC, Military Officers' Training Program

The Department of Military Science offers the Reserve Officers' Training Corps (ROTC) program. The goal of ROTC is to develop men and women with leadership potential and prepare them for an officer's commission in the military service of the United States. The curriculum teaches principles of personnel management and seeks to develop leadership traits such as teamwork, ready acceptance of responsibility, the desire to achieve, self-confidence, and discipline.

The Army ROTC program is conducted at Northeastern. The Air Force and Navy ROTC programs are conducted at Boston University. For more information, write or call the Department of Military Science, 430 Parker Building, Northeastern University, Boston, MA 02115, 617-373-2372.

Marion M. Ferguson, Lt. Col., U.S. Army, MS, *Professor and Chair,*
Department of Military Science

Assistant Professors

Warren K. Dixon, Maj., MA
Kerry M. Granfield, Capt., BA
Dominic D. Swayne, Capt., BS

Completion of the program can lead to an officer's commission in the United States Army, Army National Guard, or United States Army Reserve.

The program consists of the basic course (freshman and sophomore years) and the advanced course (middles, junior and senior years). It does not conflict with co-op schedules.

Enrollment in the basic course is voluntary and is open to all full-time students who are United States citizens. Students in the basic course do not incur a military obligation.

The advanced course is open to all qualified students who meet these prerequisites: completion of the basic course (or approved equivalent), or prior honorable military service; physical aptitude and medical requirements; and age requirements. Advanced course students receive a \$100-per-month stipend, up to \$1,000 per year. They are also paid for the six-week advanced camp they normally attend between their junior and senior years. Uniforms are issued to cadets without cost except for a refundable uniform deposit.

Full-time students meeting specific requirements may apply for scholarships covering their last four, three, or two academic years. These are merit-based scholarships, and a student's earnings during cooperative work periods do not reduce scholarship payments. The Army ROTC scholarship pays 80 percent of the student's tuition and provides an allowance for textbooks and laboratory fees, plus an additional living allowance of \$100 per month, up to \$1,000 for each year the scholarship is in effect.

Transfer students, whether or not previously enrolled in ROTC, are welcomed to join the program. They should contact the Department of Military Science concerning their options for program enrollment. Honorably discharged veterans (enlisted) are a vital part of our cadet corps and will receive special consideration for ROTC enrollment.

James L. Frey, Lt. Col., U.S. Air Force, MPA, *Professor and Chair,*
Department of Aerospace Studies, Boston University

The Air Force Reserve Officers' Training Corps (AFROTC) program offers students an opportunity to earn a commission in the United States Air Force. The student is commissioned as a second lieutenant upon completion of both the aerospace studies (AS) curriculum and the requirements for an undergraduate or graduate degree. AFROTC classes and leadership laboratories are conducted on the Boston University campus. For more information, write the Department of Aerospace Studies, Boston University, 118 Bay State Road, Boston, MA 02215-1796, or call 617-353-4705.

The AFROTC program offers a four-year and a two-year program. Undergraduates may join the four-year AFROTC program by registering for the appropriate aerospace studies classes. Students from all academic disciplines, including five-year co-op, may register. Preferred entry is the first quarter of the first year, although students may enter as late as November of the sophomore year.

Academic coursework focuses on the functions and organizations of the Air Force, military history with an emphasis on the use of airpower, management techniques, and international relations and the impact policies have on the defense establishment. In addition, weekly leadership laboratories introduce students to Air Force customs and leadership skills. The Air Force uniform and AFROTC books are provided to the student free of charge except for a refundable uniform deposit.

Participation in AFROTC by nonscholarship students during the first two years of the four-year program carries no commitment to serve in the Air Force. The nonflying commissioned graduate incurs a four-year active duty service commitment. Navigators incur a six-year post-training commitment, and pilots incur a ten-year post-training commitment.

For entry into the two-year program students must have at least six remaining academic quarters of undergraduate or graduate study, meet Air Force physical standards, be of good moral character,

Army

Air Force

and successfully complete a six-week field training encampment during the summer before the start of the junior year. Prospective two-year program members should contact the University AFROTC detachment no later than December of the sophomore year.

Two scholarship programs are available. High school seniors may apply for the College Scholarship Program before December 1 of their senior year through their academic advisers or a local Air Force recruiter. The Scholarship Actions Program is available to freshmen and sophomore students. Students who attend AFROTC classes in the fall quarter of their freshman year are eligible for two- or three-year scholarships; others are eligible for two-year scholarships.

Navy

Michael E. Field, Capt., U.S. Navy, MA, *Professor and Chair,*
Department of Naval Science, Boston University

The Naval Reserve Officers' Training Corps (NROTC) Nurse program provides an opportunity for a commission as a naval officer in the Nurse Corps. Nursing students at Northeastern may enroll in the NROTC Nurse program with the Department of Naval Science at Boston University.

Anyone wishing to contact NROTC should write to or call the office of the Commanding Officer, NROTC Unit, Boston University, 116 Bay State Road, Boston, MA 02215-1796, 617-353-4232/2535.

NROTC has two basic programs: the scholarship program and the college program. The scholarship program provides full tuition, uniforms, books and fees, and a \$100 per month stipend for four or two years of instruction at Northeastern University. These scholarships are granted as a result of annual nationwide competition. The college program provides students with naval science texts, uniforms, and a \$100 per month stipend during the last two academic years. Scholarships may be awarded to selected applicants who have been active in the college program for at least one semester. Applications for the college program are made through the Department of Naval Science at Boston University.

A two-year program is available for sophomores or middlers who do not join NROTC by the start of their sophomore year. Both scholarship and college program options are available; selection for this program takes place in the spring, and all applications must be submitted by late February of the sophomore year.

To be eligible for the Naval ROTC program, students must meet citizenship, age, and physical fitness requirements and be enrolled in a program leading to a nursing baccalaureate degree.

The NROTC program requires completion of both the academic major, including three quarters of English composition, and the naval science curriculum; participation in leadership laboratories (two hours a week during the school year); and indoctrination tours conducted at Navy/Marine Corps facilities.

The NROTC Nurse program also requires some professional training, depending on the program and the time of entry. This training occurs during summer "cruises" of four to six weeks each for scholarship students, and one "cruise" of four to six weeks for college program students.

Upon graduation and completion of NROTC requirements, scholarship students are obligated to serve on active duty for four years, college-program students for three years.

Academic Programs and Curriculum Guide

About Sample Curricula

Each department description includes a sample of the curriculum a student might follow to meet degree requirements. These sample curricula are for general information. Course requirements, elective course distribution, and achievement levels vary from program to program, and even class to class. Consult with your academic advising office, listed below, to make certain you have all the necessary resources before planning your own curriculum.

Alternative Freshman-Year Program	249 Ryder
College of Arts and Sciences	400 Meserve
African-American Studies	132 Nightingale
American Sign Language– English Interpreting	276 Holmes
Anthropology/Sociology	501 Holmes
Art and Architecture	239 Ryder
Biology	414 Mugar
Chemistry	102 Hurtig
Communication Studies	147 Meserve
Economics	301 Lake
Education	54 Lake
English	406 Holmes
Geology	14 Holmes
History	249 Meserve
Human Services	210 Lake
Journalism	102 Lake
Linguistics	565 Holmes
Mathematics	567 Lake
Modern Languages	360 Holmes
Music	351 Ryder
Philosophy and Religion	103 Meserve
Physics	111 Dana
Political Science	303 Meserve
Psychology	125 Nightingale
Theatre	337 Ryder
Bouvé College of Pharmacy and Health Sciences	206 Mugar
College of Business Administration	250 Dodge
College of Computer Science	161 Cullinane
College of Criminal Justice	400 Churchill
College of Engineering	220 Snell
College of Nursing	102 Robinson
School of Engineering Technology	120 Snell

Special note. In assessing quarter weights for courses, one quarter-hour of credit is equal to 50 minutes of instruction per week, plus two hours of preparation.

The Scheduling Office, 126 Hayden Hall, maintains all quarter-hour weights for courses. In the event of error in any publication, the academic record will reflect the correct quarter-hours applicable to any degree requirement.

Some course titles change, while the course number remains the same. Students must be sure not to register for a course they have already taken.

Middler-Year Writing Requirement

All middlers (that is, students who have earned 80+ quarter hours including non co-op students) must complete this graduation requirement at Northeastern. The requirement should preferably be completed before students accrue 144 quarter hours. Successful completion of Freshman English is a prerequisite to the MYWR. Students fulfill the Middler-Year Writing Requirement in one of two ways, depending on the requirements of their college: 1) complete a four quarter-hour MYWR course with a grade of C (2.0) or better; or 2) pass a one quarter-hour Writing Workshop (pass/fail). No transferred course from another university may satisfy this requirement.

This University requirement is designed to help students improve their writing for major courses and in their workplaces. The eight courses are therefore interdisciplinary so that students may write in subjects related to their major. For additional information, students may contact the English department, 406 Holmes Hall, 617-373-2512.

Intermediate Writing	ENG 1350
Writing for the Professions: Business Administration	ENG 1381
Writing for the Professions: Criminal Justice	ENG 1382
Technical Writing	ENG 1125
Writing Workshop specified for major	ENG 1340

Writing for the Professions: Health Services	ENG 1380
Advanced Writing	ENG 1352
Topics in Writing	ENG 1360
Technical Writing 2	ENG 1370

Colleges have specific guidelines and schedules for options that apply to majors. Students should consult their dean's office or adviser for guidelines. The following colleges recommend these MYWR courses.

College of Arts and Sciences	ENG 1350
Bouvé College of Pharmacy and Health Sciences (PAH)	ENG 1350 or ENG 1340
College of Business Administration	ENG 1381
College of Computer Science	ENG 1125
College of Criminal Justice	ENG 1382
College of Engineering (ENG'G)	ENG 1125 or ENG 1340
School of Engineering Technology (ENG'G)	ENG 1340
College of Nursing	ENG 1380

Undergraduate Degrees

College of Arts and Sciences

Majors Concentrations Minors

Bachelor of Arts

Bachelor of Science

Bachelor of Science in Education

African-American Studies

Cultural Studies
Historical Studies
Social/Behavioral Studies
African-American Studies

American Sign Language– English Interpreting¹

Anthropology

Anthropology

Applied Physics¹

Art

Architecture
Graphic Design
Art

Biochemistry¹

Biology

Chemistry

Chemistry

Communication Studies

Speech and Rhetoric
Organizational
Communication
Radio and Television
Communication Studies

Economics

Economics

Education

Early Childhood Education
Elementary Education
Education

English

English

Environmental Geology

Environmental Geology

Geology

Geology

History

History

Human Services²

Human Services

Independent Studies

Journalism

Advertising
Newspaper/Print
Public Relations
Radio/Television News

Linguistics

Linguistics

Mathematics

Mathematics

Modern Languages

French
German
Italian
Russian
Spanish
French
German
Italian
Russian
Spanish

Music

Music Industry
Music Literature
Music Literature and
Performance
Music
Music Industry

Philosophy

Philosophy

Physics

Physics

Political Science

Law and Legal Issues
Public Administration
Political Science

Psychology

Psychology

Sociology

Sociology

Theatre

Theatre Generalist
Production
Performance
Theatre

Interdisciplinary Minors

Asian Studies
Cinema Studies
Jewish Studies
*Latino, Latin American,
and Caribbean Studies*
Linguistics
Marine Studies
Media Studies
Technical Communication
Urban Studies
Women's Studies

¹ Bachelor of Science only

² Bachelor of Science in Education also offered

**Bouvé College of
Pharmacy and
Health Sciences**
Associate in Science**Bachelor of Science****Majors**
*Minors***Athletic Training**
Cardiopulmonary Science
**Cardiovascular Health and
Exercise****Health Information
Administration****Medical Laboratory Science**
*Medical Laboratory Science***Additional Degrees****Associate in Science in Dental
Hygiene**
**Bachelor of Science in Dental
Hygiene****Bachelor of Science in Pharmacy**
**Bachelor of Science in Physical
Therapy****Bachelor of Science in
Respiratory Therapy**
Bachelor of Science in Toxicology

**College of Business
Administration**
**Bachelor of Science in
Business Administration****Bachelor of Science in
International Business****Concentrations****Accounting**
**Entrepreneurship and New
Venture Management**
Finance and Insurance**Human Resources**
**International Business
Administration**
Logistics and Transportation**Management**
**Management Information
Systems**
Marketing*Minor**Business Administration*

**College of Computer
Science**
Bachelor of Science**Bachelor of Arts**

College of Criminal Justice**Bachelor of Science**

Concentrations

Criminology and Corrections
Legal Studies
Policing and Security

College of Engineering**Bachelor of Science****Bachelor of Science in Chemical
Engineering****Bachelor of Science in Civil
Engineering****Bachelor of Science in Electrical
Engineering**

Majors

Electrical Engineering
Computer Engineering
Power Systems

Additional Degrees

**Bachelor of Science in Industrial
Engineering****Bachelor of Science in Mechanical
Engineering****Bachelor of Science/Master of
Science in Electrical Engineering****Bachelor of Science/Master
of Science in Industrial
Engineering****Bachelor of Science/Master of
Science in Mechanical Engineering**

Concentration

Computer Engineering

College of Nursing**Bachelor of Science in Nursing**

**School of Engineering
Technology**
**Bachelor of Science in Engineering
Technology**
Majors
**Aerospace Maintenance
Engineering Technology**
Computer Technology
**Electrical Engineering
Technology**
**Mechanical Engineering
Technology**

**Boston-Bouv  College of
Human Development
Professions¹**
Bachelor of Science
Bachelor of Science in Education
**Bachelor of Science in Recreation
and Leisure Studies**
Majors
**Physical Education/
Teachers Preparation**
**School and Community
Health Education**

¹ Boston-Bouv  College of Human Development Professions degrees will be discontinued after June 30, 1997.

College of Arts and Sciences

Robert P. Lowndes, PhD, *Dean*

Timothy Donovan, PhD, *Associate Dean, External Affairs*

Kay D. Onan, PhD, *Associate Dean, Faculty Affairs*

James R. Stellar, PhD, *Associate Dean, Undergraduate Affairs*

Mary Mello, MA, *Academic Administrative Services*

Charles J. Haberle, MS, *Assistant Director, Academic Administrative Services*

Gail F. Leclerc, MEd, *Academic Adviser*

Joseph O. B. Monahan, MA, *Coordinator, International Study Programs*

Lisa Nefussy, *Coordinator, Undergraduate Student Services*

A broad study of disciplines in the arts and sciences is the core of higher education. Most students in the University—no matter what career training they choose—devote a substantial portion of their studies to the arts and sciences.

The college as a whole emphasizes general education through the college core curriculum. In addition, a large number of interdisciplinary and extradisciplinary programs are available. These include national and international exchange programs for study and experience; programs in field settings at sea and abroad; and programs involving affiliations in such areas as professional performing arts organizations, media organizations, and government offices.

In most programs, students may choose a four-year, full-time track or the five-year co-op plan. The five-year plan offers opportunities for paid employment, often in an area related to the student's chosen academic area. Students are normally eligible to participate in co-op when they become sophomores.

Students may enter the college with a specified major or with an unspecified liberal arts major preference (LAMP). Students in the LAMP program, however, must declare a major by the end of the freshman year. Considerable flexibility exists, and many students change majors during the first two years. The college offers a Bachelor of Arts degree and a Bachelor of Science degree in most programs, as well as a Bachelor of Science in Education dual major in several programs. In general, the Bachelor of Arts degree requires more college core curriculum courses as well as a foreign language or American Sign Language. The Bachelor of Science and Bachelor of Science in Education degrees require fewer core curriculum courses but more work in the specific majors.

Many programs are flexible enough to allow students to pursue a double major. To do so, students must complete requirements for both majors.

The college also offers the option of an independent major for students whose interests and goals are not met by a specific major program. Interested students should consult an adviser in the dean's office after their sophomore year.

Class Entrance Requirements

In order to make normal progress, students in the College of Arts and Sciences are expected to maintain a minimum cumulative quality-point average of 2.0 and to earn 16 quarter hours of credit each quarter. For further details, refer to the *College of Arts and Sciences Guidebook* available from the dean's office, 400 Meserve Hall.

Graduation Requirements

Quantitative. Candidates for either the Bachelor of Arts or Bachelor of Science degree must successfully complete 176 quarter hours. In addition, only 4 quarter hours of physical education and no ROTC credits may be used to meet this requirement.

Residency. Candidates must complete either 75 percent of the degree credit (132 quarter hours) or the last three full quarters (a minimum of 12 four-credit courses) in the Northeastern University Basic Day Colleges.

Qualitative. Candidates must achieve a minimum cumulative average of 2.0 (grade of C).

Transfer credit. Transfer credit is granted initially for courses that fulfill major, college, or elective requirements in an arts and sciences program. Courses must be from an accredited college or university and credit will be granted only for courses in which the student earned a grade of at least C (2.0). Courses taken pass/fail are not eligible for transfer credit. To receive credit for courses in progress at the time of application, the student must submit an updated official transcript for review. Students should contact a major or dean's office adviser prior to enrollment to have transfer credits evaluated, both for major and college requirements. Students who believe that they should be granted additional transfer credit should consult with an academic adviser in the College of Arts and Sciences dean's office, 400 Meserve Hall.

Core curriculum. The College of Arts and Sciences core curriculum is required of all students. The core curriculum is a set of requirements intended to provide students with the opportunity to gain the broad base of knowledge traditionally associated with a liberal arts education. The core allows students to develop proficiency in basic skills; to be exposed to methods of inquiry in the various subjects and disciplines in the arts and humanities, the social sciences, and the natural sciences and mathematics; and to become acquainted with ideas in Western culture, differing views in non-Western cultures, and major issues and problems facing contemporary society.

The core curriculum consists of six categories:

Category I Basic Skills

- Freshman English (two or three courses)
- College mathematics
- Modern language or American Sign Language through Intermediate 2 level (required of all Bachelor of Arts candidates)

Category II Methods of Inquiry

Category III The Western Cultural Heritage

Category IV Alternative Cultures and Societies

Category V Theoretical Perspectives and Changes

Category VI Current Issues in Perspective

For placement information on freshman English, college mathematics, or modern languages, students should consult the Office of the Dean, 400 Meserve Hall, or the appropriate department.

Placement criteria are published in *The College of Arts and Sciences Guidebook*.

Descriptions for all College of Arts and Sciences courses begin on page 104. Courses approved for the college's core curriculum have Roman numerals in parentheses at the end of the descriptions to indicate the appropriate core curriculum categories for each core course. Students are required to complete courses in each category of the core, depending on the major and degree pursued. The *College of Arts and Sciences Guidebook*, available in the Office of the Dean, 400 Meserve Hall, provides a list of courses that may be used to fulfill each category requirement.

Foreign language. All Bachelor of Arts degree candidates must show proficiency in a modern foreign language or American Sign Language by earning a passing grade in Intermediate 2 level of a college course or by meeting a comparable criterion approved by the Department of Modern Languages.

Conditional exemption from this requirement may be granted to students who earned an average of C or better in a full, four-year language sequence in secondary school. A conditional exemption must be confirmed by taking a proficiency examination during the first quarter at the University. A sufficiently high score will verify the exemption; otherwise, the student will be advised of the appropriate language course to take in the following quarter.

Absolute exemption is granted to students for whom English is a foreign language or who receive a score of 550 or better in the Language Achievement Examinations.

The normal sequence for students with no prior preparation is two quarters of elementary-level language and two quarters of intermediate-level language. The Department of Modern Languages will determine an appropriate entry point at which students who have partial language preparation may begin completing the requirement. Students who plan to use German, Russian or Italian to fulfill the foreign language requirement should begin study as early as possible; the college is not able to offer these courses on a regular basis.

Middler-year writing requirement. The middler-year writing requirement (MYWR) may not be fulfilled until the student has successfully completed at least 80 quarter hours (including transfer credit) and should preferably be completed before 144 quarter hours. The requirement must be fulfilled at Northeastern. The College of Arts and Sciences strongly recommends intermediate writing (ENG 1350) to complete the MYWR. Students may, however, also satisfy the requirement by completing a four-credit writing course from the approved MYWR list (found in the *College of Arts and Sciences Guidebook*) with a grade of C or better or, with special permission, a one-credit writing workshop (ENG 1340). Students not participating in the cooperative education program complete the MYWR in their junior year.

Interdisciplinary Minors

Minor in Asian Studies Curriculum

Students may choose a concentration in Middle Eastern studies or East Asian studies (China, Japan, Korea). Courses cover a range of academic disciplines including anthropology, history, music, philosophy and religion, sociology, language, and political science. In each concentration, three core courses and four electives are required.

Concentration in Middle Eastern studies. HST 1612, The Modern Middle East; PHL 1280, Islam; and POL 1345, Government and Politics in the Middle East. Choose four electives: ECN 1332,

Economic History of Less Developed Countries; HST 1613, Contemporary Middle East; HST 1614, The Middle East Today in Fact, Fiction, and Film; HST 1652, Islam Resurgent; MUS 1182, Music of the Middle East; and POL 1384, Arab-Israeli Conflict.

Concentration in East Asian studies. HST 1637, Modern Japan; PHL 1275, Eastern Religions; and POL 1371, Government and Politics of China. Choose four electives: HST 1150, Introduction to Third World History; HST 1633, Modern China; HST 1634, Contemporary China; POL 1332, Government and Politics of Japan; HST 1641, Recent Leaders of Asia; PHL 1130, Ethics: East and West; PHL 1255, Indian Philosophy; PHL 1250, Chinese Philosophy; PHL 1293, Mysticism: East and West; POL 1372, China's Foreign Relations; and SOC 1104, Contemporary Japanese Culture and Society.

For both concentrations, it is strongly recommended that students gain proficiency in an Asian language. Chinese courses are currently taught in the program.

Minor in Cinema Studies Curriculum

The minor in cinema studies helps students acquire skill in analyzing one of the major art forms and cultural influences of the twentieth century. It also provides critical tools that can be used to study the relationships between film and society, history, aesthetics, performance, philosophy, and psychoanalysis. Students take eight courses: two required courses, a filmmaking requirement, and five electives. The interdisciplinary curriculum draws from courses in several departments.

LNF 1550, Introductory Film Analysis; LNF 1551, Film Theory; and one of the following: ART 1171, Animation Workshop; ART 1180, Video Basics; or CMN 1450, Television Studio Production. Choose five electives: ART 1233, Contemporary Directions in Cinema; ART 1235, History of Film; ART 1236, The American Film; ART 1238, Documentary Film; ART 1281, Video Project; ENG 1288, Film and Text; ENG 1289, Shakespeare on Film; ENG 1290, Topics in Film (may not be counted more than twice); ENG 1291, Popular Culture; ENG 1294, Modern Film; ENG 1295, American Film and Society; ENG 1297, Approaches to Film; HST 1494, History and Film; HST 1575, History of Media in America; HST 1591, American Images of China; INT 1320, Exploring the Humanities through Film; INT 1321, Modernism; LNF 1521, French Film and Culture; LNF 1560, Film and Psychoanalysis; LNF 1554, Modern German Film and Literature; LNS 1550, Spanish Civil War in Spanish Film; MUS 1139, Film Music; SOA 1120, Camera on Culture: Visual Anthropology; CMN 1454, Programming for Radio and Television; CMN 1455, Television Field Production; CMN 1554, Special Topics in Media (when appropriate); THE 1316, Acting for the Camera; THE 1849, Special Topics.

For more information, contact the director of cinema studies, Professor Inez Hedges (1 Boston YMCA), at 617-373-5163.

Minor in Jewish Studies

The minor in Jewish studies provides students the opportunity to undertake the study of Jewish religion, culture, and history at Northeastern or in combination with courses at Hebrew College in Brookline, Massachusetts, and courses under the study abroad program. Students take seven courses. A minimum of four courses must be taken at Northeastern.

All students must take PHL 1285, Introduction to Jewish Religion and Culture, and a senior-level directed study or seminar that involves a major research project.

Additional courses at Northeastern. HST 1539, American Jewish History; POL 1384, The Arab-Israeli Conflict; PHL 1315, Understanding the Bible; ENG 1558, Jewish Themes in Literature (Literature in Context); MUS 1185, Music of the Jewish People; SOC 1350, Jewish Women in U.S. Culture; PHL 1110, Introduction to Religion* or SOC 1470, Sociology of Religion*; SOC 1140, The Sociology of Prejudice.*

*Students wishing to take these courses must complete a research project directly related to Jewish studies.

Students may petition the Jewish studies coordinator to gain Jewish studies credit for any courses not on this list for which they do substantial work in Jewish studies.

Courses at Hebrew College. Students take courses approved by the coordinator of Jewish studies at Northeastern. Students should contact the University registrar, Dean Edmund Mullen, for more information about enrolling at Hebrew College.

Study abroad. Students take courses at Hebrew University, Tel Aviv University, or Ben Gurion University under the study abroad program. Courses must be approved by the coordinator of Jewish studies at Northeastern.

For more information contact the Jewish studies coordinator, Professor Joshua Jacobson, at 617-373-2440.

Minor in Latino, Latin American, and Caribbean Studies

This minor offers students an interdisciplinary curriculum drawn from seven academic departments. The Latin American and Caribbean studies emphasis combines historical, social-scientific, ecological, and cultural-aesthetic approaches to the study of Latin American society. Latino studies explores the large, long-standing, and growing Latin American presence in communities outside Latin America, especially in North America. The minor helps students prepare for more specialized work in fields such as business, social services, diplomacy, health, law, education, and international relations with Latin American and Latino populations both in the United States and abroad.

The minor includes a strong link to the co-op program, to community-based internships, and to study abroad programs. It is strongly recommended that students pursuing the minor achieve proficiency in Spanish. Students take six required courses and either complete an internship or co-op experience in a community-based agency or participate in a study abroad program. All students must take INT 1121, Introduction to Latino, Latin American and Caribbean Studies; one course in history; one course in language, literature, and music; one course in social science; and two comparative courses that include Latin American, Caribbean, or U.S. Latino populations. Students should consult with the academic adviser for the minor to make final determination of courses included.

History: AFR/HST 1196, The Black Experience in the Caribbean; HST 1538, Latinos in the U.S.; HST 1604, Modern Latin America; HST 1605, The Modern Caribbean; HST ____, U.S. History from a Latino Perspective.

Humanities, language, and literature: LNS 1315, Latin American Literature (Colonial, 19th Century); LNS 1316, Latin American Literature (20th Century); LNS 1500, Backgrounds in Hispanic Culture; LNS 1501, Backgrounds in Latin American Culture; LNS 1511, Introduction to Caribbean Literature; MUS 1184, Music of Latin America and the Caribbean; and new courses added in this area.

Social science: POL 1368, Government and Politics of Latin America; SOA 1430, Latin American Society and Development; SOC 1460, Sociology of Latino Society; and new courses added in this area.

Comparative Studies (courses that include components of Latino, Latin American and Caribbean societies and compare them to other societies): AFR 1151, African-American Art History; AFR 1155, Foundations of Black Culture; AFR 1294, Third World Political Relations; Pol 1316, Contemporary Revolutionary Politics; POL 1386, International Law; SOA 1100, Peoples and Cultures; SOA 1104, Cultures of the World; SOA 1146, Rural Workers in the Third World; SOC 1146, Environment and Society; SOC 1170, Race and Ethnic Relations; SOC 1171, Race and Ethnic Relations: A World Perspective; SOC 1255, Sport in Society; SOC 1455, Sport and Culture; THE 1847, Images of Afro-American and Latina Women in Film; and new courses added in this area.

Minor in Linguistics Curriculum

ENG 1118, Introduction to Language and Linguistics; one of the following: ENG 1401, Introduction to Syntax; LNL 1220, Introduction to Phonetics and Phonology; PSY 1262, Psychology of Language.

Four from the following (not taken above): AFR 1231, African American English; AFR 1415, African Languages; ASL 1350, Linguistics of American Sign Language; ENG 1119, History of the English Language; ENG 1401, Introduction to Syntax; ENG 1402, Grammars of English; ENG 1407, Semantics; ENG 1408, Topics in Linguistics; ENG 1690/1691, Junior/Senior Seminar (linguistics, stylistics); ENG 1810/1811, Directed Study; LNF 1250, History of the French Language; LNG 1801, Directed Study; LNL 1220, Introduction to Phonetics and Phonology; LNL 1235, Applied Linguistics; LNL 1236, Advanced Applied Linguistics; LNL 1240, Bilingualism; LNL 1260, Introduction to Romance Linguistics; LNS 1250, History of the Spanish Language; PHL 1215, Symbolic Logic; PHL 1440, Philosophy of Language; PHL 1800, Directed Study; PSY 1262, Psychology of Language; PSY 1263, Nonverbal Communication; PSY 1362, Child Language; PSY 1364, Cognition; PSY 1365, Language and the Brain; PSY 1562, Laboratory in Psycholinguistics; PSY 1564, Laboratory in Cognition; PSY 1661, Seminar in Psycholinguistics; PSY 1662, Seminar in Cognition; PSY 1890, Directed Study; SOA 1335, Language and Culture; SOA 1800, Directed Study.

Minor in Marine Studies Curriculum

The marine studies minor allows students from all majors to explore the marine environment. Students may focus on either the scientific or social science/humanistic approach to studying the ocean. The program is designed to develop specific marine-related skills and requires completion of an independent study. Students are encouraged to participate in marine field courses such as Northeastern's East-West Program, which focuses on biological research, or the SeaSemester Program, which includes sail-training on a tall ship.

For more information contact Professor Peter Rosen, marine studies coordinator, 617-373-3176.

Minor in Media Studies Curriculum

To qualify for a minor in media studies, the student must complete a minimum of eight courses: CMN 1250, Introduction to Mass Communication; HST 1575, History of Media in America; and CMN 1300, Communication Theory *or* CMN 1317, The Audience in Mass Communication *or* INT 1320, Exploring Humanities through Film; and five elective courses from the two categories media production and media application (at least two electives in each category). Individual student programs may be developed. Students should contact Professor Alan Zarembo (Department of Communication Studies) for information on program development and elective choices.

Minor in Technical Communication Curriculum

Technical communication combines written, oral, and graphics skills with a background in science or technology. The minor in technical communication prepares students for careers as technical writers, or for careers in which technical communication is a significant part of the job. Students in English or other liberal arts studies may elect the minor, as may students from a variety of technological or scientific fields. A student does not have to be enrolled in the College of Arts and Sciences to declare the minor.

Eight courses are required: ENG 1125, Technical Writing; ENG 1370, Technical Writing 2 *or* ENG 1371, Writing for the Computer Industry; ENG 1352, Advanced Writing *or* ENG 1380, Writing for the Professions: Health Services *or* ENG 1381, Writing for the Professions: Business Administration; CMN 1116, Public Speaking *or* CMN 1331, Advanced Interpersonal Communication; JRN 1440, Design and Graphics (or an equivalent in another department or college); COM 1101 Algorithms and Data Structures 1; and two of the following, preferably both within the same discipline: BIO 1106, General Biology; BIO 1107, Animal Biology; CHM 1111, General Chemistry 1; CHM 1112, General Chemistry 2; GE 1106, Programming Computers; GEO 1212, Physical Geology; GEO 1222, Historical Geology; IIS 1125, COBOL Programming 1; PHY 1221, Physics for Science and Engineering Students 1; PHY 1222, Physics for Science and Engineering Students 2; PHY 1223, Physics for Science and Engineering Students 3.

Minor in Urban Studies Curriculum

Students must take seven courses. SOC 1147, Cities and Society; POL 1324, Urban Politics; ECN 1320, Urban Economics; and one course from each of the following areas:

Urban problems and policies: SOC 1346, Suburb and Metropolis; POL 1308, Politics of Poverty; POL 1318, State and Local Government; ECN 1321, Urban Economic Problems and Policies.

Urban humanities: HST 1391, European Urban History to 1850; HST 1543, American Urban History; ENG 1608, The City in Literature.

Urban form and design: ART 1111, Introduction to Architecture; ART 1225, Modern Architecture 1; ART 1150, Architectural Design 1.

African-American studies : AFR 1261, Economics of Urban Poverty; AFR 1275, Urban Political Issues; AFR 1475, Public Policy Analysis.

To obtain credit for the minor, students must file a petition form with the College of Arts and Sciences. Interested students should confer with an adviser as soon as possible. Advisers are Professor John Portz, political science, 303 Meserve Hall, 617-373-2796; Professor Peter Serenyi, art and architecture, 239 Ryder Hall, 617-373-2347; Professor Gregory Wassall, economics, 317 Lake Hall, 617-373-2196.

Minor in Women's Studies Curriculum

Women's Studies is an interdisciplinary program that incorporates scholarship on women's and men's roles in society and examines the importance of gender in past and present societies. Students examine traditional stereotypes and changing roles; learn about women in history, literature, culture, and politics; and consider the changing situation of men and women today. The Women's Studies Program coordinates the Boston Area Colloquium on Feminist Theory, organizes an in-house lecture series, produces the Working Papers in Gender Studies Series, and sponsors the International Research Associates in Women's Studies for visiting scholars. The program also maintains liaisons with the student-run Women's Center at Northeastern.

Students take a total of seven courses: SOC 1150 *or* INT 1150, Introduction to Women's Studies; SOC 1302 *or* INT 1302, Feminist Perspectives on Society; and five electives.

Undergraduate elective courses. AFR 1241, Black Family; AFR 1121, African American Literature 1; AFR 1133, History of Blacks in Media Press; AFR 1251, Survey of Black Drama; AFR 1442, African American Women; CJ 1616, Women and the Criminal Justice System; CMN 1232, Female/Male Communication; ECN 1312, Women in the Labor Market; ENG 1551, Gender Roles in Literature; ENG 1600, Topics in Literature; ENG 1602, Major Figure; ENG 1678, Early African American Literature; other literature courses when gender-oriented; HST 1472, The Family in European History; HST 1473, Women in Modern Europe; HST 1554, Women in America; HST 1644, Third World Women; LNF 1560, Film and Psychoanalysis; LNS 1306, Spanish Golden Age Theatre; LNS 1500, Backgrounds of Spanish Culture; LNS 1510, Saints and Sinners; MUS 1106, Women in Music; MUS 1134, I Music and Poetry; MUS 1800, Directed Study; NUR 1303, Life Crisis: Analysis and Response; NUR 1606, Women's Health Choices; PHL 1295, Medicine, Religion, and the Healer's Art;

POL 1327, Sex Roles in American Politics; POL 1328, Women in Public Management; POL 1346, Gender and Politics in the Middle East; PSY 1218, Psychology of Women; SOA 1100, Peoples and Cultures; SOA 1146, Rural Workers in the Third World; SOA 1160, Sex, Sex Roles, and the Family; SOA 1301, Human Origins; SOA 1303, Sexuality and Culture; SOA 1430, Latin American Society and Development; SOC 1150, Women in Jewish Culture; SOC 1155, Sociology of the Family; SOC 1160, Sex-Gender Roles in a Changing Society; SOC 1177, Social Roles in the Business World; SOC 1178, Women Working; and SOC 1217, Women, Health, and Social Change.

Graduate elective courses. CJ 3515, Gender and Justice: Women, Crime, and the Law; CRS 3556, Seminar in Feminist Theory; ENG 3315, Contemporary Critical Theory; ENG 3317, Topics in Criticism: Feminist Literary Theory; ENG 3333, Major Figures in African American Literature; Topics in Literature courses accepted when focused on women; ENG 3403, Topics in Linguistics: Language, Gender, and Power; HST 3370, Seminar in History of the Family; HST 3399, Seminar in Approaches to Women's History; POL 3665, Women in Public Management; POL 3667, Equal Opportunity in Public Administration; SOA 3102, Class and State Formation; SOA 3156, Gender, Kinship, and Social Change; SOC 3155, The Family; SOC 3160, Women, Men, and Social Change; SOC 3175, Sociology of Work; SOC 3304, Feminist Theory; SOC 3365, Social Movements; and SOC 3412, Contemporary Issues in Sociology when gender oriented.

These are only some of the courses offered. New courses are continually being developed and added to the program. For more information and the most recent brochure describing the Women's Studies Program, contact Professor Debra Kaufman at 617-373-4442 or Ms. Audrey Aduama, 617-373-4984.

Special Programs

Additional information is available from involved departments and the Office of the Dean, 400 Meserve Hall.

The availability of all special programs is contingent on meeting minimum enrollment numbers and, when an outside institution is involved, continued affiliation of that institution with the University. Overseas study programs are open to qualified middlers, juniors, and seniors with a cumulative quality-point average of 3.0 or higher.

Independent Major

An eligible student may petition the College Curriculum Committee to meet requirements for a degree in an independent major. Eligibility, procedures, and requirements must be discussed in advance with an adviser in the Office of the Dean. No student may be considered for an independent major until a curriculum proposal has been submitted to, and approved by, the College Curriculum Committee.

Combined Program with Professional Schools

In the combined program, a preprofessional student may reduce by one year the time normally required for obtaining both the undergraduate and professional degrees. Students who have completed at least three-fourths of the work required for a baccalaureate degree in the College of Arts and Sciences and who are accepted into an approved professional school of dentistry, law, medicine, optometry, osteopathy, or veterinary medicine will be eligible for the Bachelor of Arts or Bachelor of Science degree at the end of their second year in a professional school. At least two-thirds of the work for the baccalaureate degree must be earned in residence at Northeastern, and all other College of Arts and Sciences requirements must be fulfilled. The residence requirement must be completed prior to entering the professional school.

Bachelor of Arts or Bachelor of Science/ Juris Doctor Degree Program

Northeastern offers an eight-year joint degree program for aspiring lawyers. Each year a limited number of highly qualified freshmen are admitted to the five-year undergraduate portion of the program.

To continue into the law school portion of the program, students must graduate in the top 15 percent of their class and score in the top 20 percent of the Law School Aptitude Test (LSAT). Students who meet these criteria will be qualified to continue their studies at Northeastern University School of Law.

Bachelor of Arts or Bachelor of Science/ Master of Business Administration Program

A limited number of students may combine an initial period of undergraduate study in the College of Arts and Sciences with graduate study in the College of Business Administration, enabling students to earn both the Bachelor of Arts or Bachelor of Science and the Master of Business Administration degrees including one year of co-op work experience (six months undergraduate and six months graduate) in a five- or six-year period.

In the first three years, students complete nine academic quarters of arts and sciences courses with two quarters of cooperative education. After taking the GMAT and being accepted into the College of Business Administration in the third year, students spend their fourth year completing requirements in their undergraduate major and beginning graduate coursework in the Cooperative Education MBA Program. Depending on the undergraduate major, twelve credits of undergraduate study may be applied toward the MBA or twelve credits of MBA study may be applied toward the bachelor's degree. Students may begin the Cooperative education MBA portion of study in January or June.

Interested students should contact the College of Arts and Sciences dean's office in 400 Meserve Hall or the College of Business Administration's graduate school in 350 Dodge Hall.

Northeastern University-Hebrew College Exchange

This program offers students the opportunity to register for courses in specialized areas of Jewish studies and Jewish education. See page 32, Minor in Jewish Studies, or contact the University registrar, Dean Edmund Mullen, 120 Hayden Hall, 617-373-2183, for more information.

International Programs

Egypt and Israel. A full-year program. Students spend the autumn at the American University in Cairo and the winter-spring period at Tel Aviv University. During the break between semesters internships in Israel will be arranged. A wide variety of arts and sciences courses are available. Classes are in English, with courses in Arabic and Hebrew available. Earns 48 quarter hour credits.

European Studies. This winter quarter program is based at the University of Louvain, Belgium, just outside Brussels. Courses (taught in English) are available on various facets of the history and culture of the European Community. Students also participate in a research internship in collaboration with the office of a Member of the European Parliament. (Students have the option of spending the preceding fall quarter in the programs in Dublin or London.)

Ireland: North and South. Students in this program spend two quarters in Ireland: fall at the Institute of Public Administration in Dublin and winter at Queen's University in Belfast. The general focus is on social sciences and humanities. Courses are available in literature, sociology, political science, history, etc. An exciting feature of the fall quarter is an internship in the Irish parliament.

London Parliamentary and Public Policy Internships. During the fall or winter quarters, students may work as assistants to Members of the House of Commons and the House of Lords, or with British political parties, public and social policy research institutes, and similar organizations. The program also includes a supervised research project and courses on British history and politics, taught at the London School of Economics and Political Science.

London University (Goldsmiths' College). A wide range of course offerings are available to Northeastern students under a direct-credit arrangement. Goldsmiths' is especially noted for its courses in literature, history, theatre, music, communications, and the social sciences. Students may spend the fall and/or winter quarter(s) in London.

Moscow State University Exchange. Courses taught in English on Russian history, politics, economics, and language are featured in this program offered during the spring quarter. A unique feature is a field trip to one of the Russian ethnic areas, to observe the effects of the new revolution on a region remote from Moscow. Students live with Russian families.

Environmental Science Field Studies Scholarships. These scholarships enable qualified students to receive grants to attend semester courses in environmental science with NU's affiliate, The School for Field Studies, in various locations—Australia, Baja California, Africa, etc. Grants bring costs to the approximate equivalent of local NU tuition, room, and board.

Spain: Language and Area Studies. Conducted at the universities of Alicante and Seville, Spain, offering beginning and advanced Spanish language, along with courses in English on various aspects of Spanish culture: history, art history, and economics, with the possibility of an internship placement (for students with advanced-level language skills). Students may go for fall quarter or full year. Includes orientation program in Madrid and homestay with Spanish families.

Sea Education Association. A combination land-sea program covering many aspects of maritime studies, including nautical science and oceanography. A six-week sea voyage provides hands-on experience; destinations include the Bahamas, Caribbean, Nova Scotia, and Newfoundland. Offered during all quarters.

Students interested in the above programs should contact the Coordinator of International Study Programs, 400 Meserve Hall, 617-373-5162.

Foreign Languages

Business German. Students may use this course as a prerequisite to conversational German courses to prepare for a business-oriented co-op in Germany. This course, taught in English, is designed for students of business and economics seeking competence in reading and understanding texts produced by the German business community and trade media. Additional information may be obtained from Professor Ross Hall in the Department of Modern Languages, 360 Holmes Hall, 617-373-2234.

Elementary Spanish for criminal justice or human services majors. This course is intended for students who will need to use Spanish in police work and in social service settings. The grammar component is the same as that in other elementary Spanish courses. The vocabulary is adapted to particular needs and interests of the students. Students use role-playing extensively and practice "intake" interviews.

French for business and economics students. Designed for students interested in international business, the program offers a thorough study of grammar, insights into the French way of life, specialized vocabulary related to the business world, and an introduction to French business texts. The course is a preliminary step for the student wishing co-op placement in France. Additional information may be obtained from Juliette Gilman, 362 Holmes Hall, 617-373-3659.

Marine Science

East/West Marine Biology Program. The East/West Marine Biology Program allows advanced undergraduate and beginning graduate students in biology and related areas to spend a year of field study in three diverse marine environments.

The program begins in the fall in Friday Harbor, Washington, on San Juan Island. In January, students travel to Jamaica to study tropical biology at the Discovery Bay Marine Laboratory on the island's north coast. The final phase of the program is conducted at Northeastern's Marine Science Center in Nahant, Massachusetts.

Marine Science Center Summer Program in Marine Biology. The summer program allows students to participate in intensive courses at the Marine Science Center (MSC). Students conduct independent research at the MSC laboratory throughout the year. Graduate students from other universities are encouraged to use the laboratory and field sites for thesis research.

Massachusetts Bay Marine Studies Consortium. Northeastern University is a member of the Massachusetts Bay Marine Studies Consortium. The consortium's offerings are interdisciplinary and seek to bridge academic disciplines and current concerns in the marine world. The consortium serves the students and faculty of twenty-two Boston-area colleges and universities. Students from Northeastern may take these classes, which are taught by specialists and government officials. For more information, contact Professor Peter S. Rosen, Department of Geology, 617-373-4380.

The Center for the Arts

The primary mission of the Center for the Arts is to support and develop the arts as a vital and integral component of the Northeastern community. Through a variety of artist-in-residency programs, featuring performing and visual artists acclaimed for their excellence, the center complements the academic arts departments in their effort to educate Northeastern students in becoming knowledgeable, discriminating, and active participants in the arts. In addition, the center supports curriculum-oriented arts projects and events, encourages interdepartmental collaborations, develops exhibitions and presentations that serve the on-campus community as well as the general public, provides multicultural arts programs, and acts as a primary facilitator for research in the arts.

The center also manages the Blackman Auditorium Theatre Complex and operates the nuArts Ticket Center. Tickets to and information about performing and visual arts events and other campus events are available in the ticket center as are tickets and passes to Boston area dance, music, theatre, film, and visual arts events. The ticket center also provides free passes and maintains a University membership to the Museum of Fine Arts that entitles all undergraduate students in the full-time day programs to free membership privileges.

For information on arts activities, please call the Center for the Arts office at 617-373-2249. For ticket information, call the ticket center at 617-373-2247.

African-American Studies

Ronald W. Bailey, PhD, *Professor and Chair*

Professor

Patrick Manning, PhD
History

Associate Professors

Abdul Alkalimat, PhD
Sociology
Jordan Gebre-Medhin, PhD
Anthropology
Maryemma Graham, PhD
Literature
Robert L. Hall, PhD
History
Leroy Johnson, PhD
African History
William Lowe, MA
Music
Joseph D. Warren, PhD
Social Welfare

Assistant Professors

Leonard Brown, PhD
Music
Robin Chandler, PhD
Sociology and Art
Elizabeth H. Freyberg, PhD
Theatre
Kwamina Panford, PhD
Law, Policy, and Society
Clark White, PhD
Sociology

Associated Faculty

Oscar Brookins, PhD
Economics
Donald M. Jacobs, PhD
History
William F. Miles, PhD
Political Science

The diverse experiences of black people—in the United States, Africa, the Caribbean, South America, and other parts of the world—are the focus of the field of African-American studies. The curriculum is interdisciplinary in approach and includes historical, social and behavioral, and cultural studies. International studies and contemporary public policy issues are also integral parts of the program. In class, in co-op, and in internships, students apply theoretical knowledge to real-world problems and concerns. Plans for a study abroad program are under way.

Students with training in African-American studies have the knowledge to meet the challenges posed by the diverse racial, cultural, and ethnic groups in the United States and abroad. Many graduates attend professional schools or teach at the secondary or the college level. Others work in museums, libraries, or research centers; in business; or in public service, social service, or law-enforcement agencies.

**Bachelor of Arts and
Bachelor of Science
Curriculum**

AFR 1100, Introduction to African-American Studies; AFR 1131, African-American History 1; AFR 1155, Foundations of Black Culture; AFR 1249, Black Community and Social Change; one course on the Black experience outside the United States; and AFR 1355, Senior Seminar.

Five courses from one of three areas of concentration: historical, cultural, or social/behavioral studies. Courses offered in other departments may also satisfy this requirement with departmental approval.

Four courses which will allow students to explore additional topics and areas of interest.

In addition, complete the arts and sciences core curriculum (see page 31).

Minor Curriculum

AFR 1100, Introduction to African-American Studies; AFR 1131, African-American History 1; AFR 1155, Foundations of Black Culture; AFR 1249, Black Community and Social Change; and AFR 1355, Senior Seminar. One course on the Black experience outside the United States. One additional elective selected by the student in consultation with a departmental adviser.

**American Sign
Language–English
Interpreting**

Marina L. McIntire, PhD, *Associate Professor and Director*

Teaching Staff

Nancy V. Becker, MEd

Barrie Booth, MEd

Alma L. Bournazian, MS

James Lipsky, BS

Alice Sykora, MEd

American Sign Language (ASL) is a language used by large numbers of people in the United States and Canada. By mastering ASL, students gain both access to the culture of Deaf America and insights into features of spoken language that are often taken for granted. Learning a modally different language gives students a new sense of the power of language and an appreciation of how it shapes their world. In this way, the mastery of ASL sharpens critical-thinking skills.

The program provides a firm foundation in language, linguistics, culture, and interpreting, plus a broad-based liberal arts education. American Sign Language courses are integral to degrees in human services with a specialization in deaf studies and in linguistics with a focus on ASL.

Opportunities for ASL–English interpreters are increasing, due to recent federal legislation. Graduates work as interpreters in such areas as higher education, advanced technology, and theatre.

The ASL Interpreter Education Project seeks to enhance the skills of interpreters currently working in the field and to increase the supply of competent interpreters in New England.

**Bachelor of Science
Curriculum**

ASL 1101, ASL 1102, American Sign Language 1 and 2; ASL 1201, ASL 1202 Intermediate American Sign Language 1 and 2; ASL 1211, Deaf Culture; ASL 1250, Linguistics of ASL; ASL 1301, ASL 1302, Advanced American Sign Language Proficiency 1 and 2; ASL 1500, Introduction to Interpreting; ASL 1505, ASL 1506, ASL 1507, ASL-English Interpreting 1, 2, and 3; ASL 1520, Interpreter Role and Ethics; ASL 1521, Contrastive Analysis; ASL 1522, Discourse Analysis for Interpreters; ASL 1810, Special Topics in Interpreting; ASL 1820, Interpreting Practicum 1; ENG 1118, Introduction to Language and Linguistics; PSY 1110, Perspectives in Psychology 1; PSY 1112, Foundations of Psychology 2; SOA 1335, Language and Culture; SOC 1100, Introduction to Sociology; and CMN 1110, Voice and Articulation.

One course from the following: ENG 1402, Grammars of English; ENG 1407, Introduction to Semantics; ENG 1408, Topics in Linguistics; ENG 1690, Junior/Senior Seminar; LNL 1235, Applied Linguistics 1; LNL 1240, Bilingualism; PSY 1262, Psychology of Language.

One course from the following: PHL 1165, Moral Problems in Medicine; PSY 1271, Social Psychology; SOC 1102, Social Inequality and Communication; SOC 1135, Social Psychology; SOC 1140, Sociology of Prejudice; SOC 1310, Class, Power, and Social Change.

One course from the following: CRS 1200, Introduction to Special Education; ED 1302, The Human Services Professions; SOC 1240, Sociology of Human Service Organizations.

One course from the following: THE 1160, Movement 1; PSY 1263, Nonverbal Communication; CMN 1111, Oral Interpretation of Literature; CMN 1115, Foundations of Communication; CMN 1330, Interpersonal Communication 1.

In addition, complete the arts and sciences core curriculum (see page 31).

Art and Architecture

Peter Serenyi, PhD, *Professor and Chair*

Professor

Mardges Bacon, PhD

Associate Professors

Samuel S. Bishop, MFA

Mira Cantor, MFA

T. Neal Rantoul, MFA

Assistant Professors

Edwin C. Andrews, MFA

Julie Curtis, MFA

Mary Ann Frye, MFA

Dianne W. Pitman, PhD

Monica Ponce de Leon, MFA

George Thrush, MArch

Lecturers

Cynthia Baron, BA

Lawrence Bluestone, MCPUD

Joanna Bowdenweber, MFA

Judith Brassard Brown, MFA

David A. Conant, MArch

Rick Eifler, MArch

Joseph Ferrara, MArch

Christopher D. Ferrier, MFA

David Florentin, BSC

Elizabeth Gibb, MArch

Patrick Hickox, MArch

David Judelson, MArch

William Loftis, MPhil

John Lueders-Booth, MEd

Uy Thanh Ly, MS

Joel Marcus, MFA

Michael McPherson, MFA

Scott Nash, MFA

James Noon, PhD

Barry B. O'Brien, MS

Thomas J. Petit, MFA

Joel Sadagursky, BS

Mark Schatz, MArch

Lisa Taft, BFA

Nader Tehrani, MAUD

Mary Ann Thompson, MArch

The visual arts are our oldest form of artistic expression. The ability to understand and use visual language is an increasingly important part of contemporary education.

The department aims to introduce art and architecture as both historical disciplines and creative activities; to offer a focused study of the visual arts, either through a critical examination of the language and the content of art and architecture within the context of a particular historical period, or through hands-on experience in a studio setting; and to offer a solid academic foundation for careers in architecture, graphic design, photography, and teaching the history and the practice of art.

Cooperative education placements for art majors include positions in architecture and design firms, museums, libraries, historical collections, and archives.

The city of Boston, with its superb architecture, museums, galleries, cinemas, and public library, is a primary resource for the department. Encouraging students to take advantage of these resources is a significant aim of the department. In addition, many of Boston's leading artists, architects, and designers teach our studio courses.

Major in art. ART 1100, History of Art to 1400, and ART 1101, History of Art since 1400; ART 1124, Basic Drawing; ART 1130, ART 1131, Visual Studies Foundation 1 and 2; and twelve art electives.

In addition, complete the arts and sciences core curriculum (see page 31).

Concentration in architecture. Leading to a BS degree that is not a professional degree in architecture. The twelve art electives are replaced by four architectural history courses (ART 111, Introduction to Architecture; ART 1203, Medieval Architecture *or* ART 1204, Renaissance Architecture; ART 1225, Modern Architecture 1 *or* ART 1223, American Architecture; and ART 1226, Modern Architecture 2).

Eight architectural studio courses: ART 1156, Architectural Drafting; ART 1150, 1151, 1252, 1253, 1258, 1259, Architectural Design 1 to 6; and ART 1350, Architectural Thesis.

Two computer courses: ART 1190, Introduction to Computer Graphics and ART 1295, Computer Aided Design.

Three building technology courses: ART 1256, ART 1257, Theory of Structures 1 and 2; and ART 1355, Environmental Systems.

Four math/science courses: MTH 1123, MTH 1124, Calculus 1 and 2; PHY 1221, PHY 1222, Physics for Engineering Students 1 and 2.

In addition, complete the arts and sciences core curriculum (see page 31).

Concentration in graphic design. Same requirements as for the art major, except that the twelve art electives are replaced by: ART 1132, Principles of Graphics; ART 1133, Graphic Design 1; ART 1134, Typography 1; ART 1144, Typography 2; ART 1160, Introduction to Photography; ART 1180, Video Basics; ART 1190, Introduction to Computer Graphics; ART 1213, Modern Art; ART 1230, History of Photography *or* ART 1237, Contemporary Directions in Cinema; ART 1240, History of Graphic Design; ART 1243, Graphic Design 2; ART 1244, Graphic Design 3; ART 1250, Color Theory and Practice; ART 1254, Intermediate Drawing; ART 1263, Introduction to Color Photography; ART 1280, Media Graphics; ART 1290, Electronic Publishing Design; ART 1291, Intermediate Computer Graphics Workshop; and ART 1330, Advanced Visual Communication.

In addition, complete the arts and sciences core curriculum (see page 31).

Bachelor of Arts and Bachelor of Science Curriculum

Minor Curriculum

General minor. Select any six courses from the departmental curriculum.

Minor in history of architecture. ART 1200, Ancient Architecture; ART 1203, Medieval Architecture; ART 1204, Renaissance Architecture; ART 1223, American Architecture; and ART 1225, ART 1226, Modern Architecture 1 and 2.

Minor in architecture. ART 1111, Introduction to Architecture; ART 1124, Basic Drawing *or* ART 1156, Architectural Drafting; ART 1226, Modern Architecture 2; ART 1150, Architectural Design 1; ART 1151, Architectural Design 2; and ART 1252, Architectural Design 3; *one of the following:* ART 1253, Architectural Design 4; *or* ART 1295, Computer Aided Design; *or* ART 1355, Environmental Systems.

Minor in studio art. ART 1124, Basic Drawing; ART 1127, Basic Painting; ART 1130, Visual Studies Foundation 1; ART 1132, Principles of Graphics; ART 1138, Introduction to Printmaking; and ART 1243, Graphic Design 2 *or* ART 1254, Intermediate Drawing.

Minor in graphic design. ART 1130, ART 1131, Visual Studies Foundation 1 and 2; ART 1132, Principles of Graphics; ART 1134, Typography; ART 1133, Graphic Design 1; and ART 1250, Color Theory and Practice.

Minor in photography. ART 1160, Introduction to Photography; ART 1261, Intermediate Black and White Photography; ART 1230, History of Photography; ART 1233, Contemporary Directions in Photography; ART 1263, Introduction to Color Photography; and ART 1363, Advanced Photography Seminar.

Biochemistry

Biochemistry includes nearly the entire spectrum of science—from physics and chemistry to biology and medicine. The biochemistry major, sponsored jointly by the departments of biology and chemistry, provides a strong foundation in mathematics and the physical sciences as well as thorough training in biochemistry, biology, and chemistry. In addition to formal classwork, opportunities are available for participation in faculty research programs on an individual basis or through the honors program. The large number of biotechnology companies and biomedical facilities in the Boston area provides a rich source of opportunities through Northeastern's program of cooperative education.

A Bachelor of Science degree in biochemistry allows students to enter the job market directly or go on to graduate, medical, veterinary, dental, law, or business school. Students may find positions in biotechnology companies, drug companies, or government agencies, working in laboratory or clinical research, quality control, production, information systems, marketing, or technical sales. Students may also pursue graduate study in biochemistry, molecular biology, cell biology, biophysics, genetics, toxicology, biotechnology, clinical chemistry, animal science, nutrition, plant science, or other biomedical sciences.

Students who are interested in attending medical, dental, or veterinary school following graduation are urged to consult with the preprofessional advisory committee early in their careers at Northeastern.

Bachelor of Science Curriculum

BIO 1103, BIO 1104, BIO 1105, Principles of Biology 1, 2, and 3; BIO 1260, Genetics and Developmental Biology; BIO 1461, General Biochemistry 1; BIO 1462, General Biochemistry Lab; BIO 1463, General Biochemistry 3; BIO 1467, Molecular Biology; and BIO 1480, Senior Biochemistry Seminar.

CHM 1111, CHM 1122, General Chemistry for Life Sciences 1 and 2 *or* CHM 1151, CHM 1152, General Chemistry for Science Majors 1 and 2; CHM 1153, The Chemical Elements; CHM 1221, Analytical Chemistry; CHM 1271, CHM 1272, CHM 1273, Organic Chemistry for Chemistry Majors 1, 2, and 3; and CHM 1280, CHM 1281, Physical Chemistry 1 and 2.

MTH 1140, MTH 1141, MTH 1142, Calculus for Science Majors 1, 2, and 3 *or* MTH 1133, MTH 1134, MTH 1135, Calculus for Biology Majors 1, 2, and 3; PHY 1201, PHY 1202, PHY 1203, Physics for Life Sciences 1, 2, and 3; two quarters of corresponding physics lab courses; six advanced biology and chemistry electives (minimum of two from each discipline); and demonstrated computer literacy.

In addition, complete the arts and sciences core curriculum (see page 31).

Biology

David C. Wharton, PhD, *Professor and Chair*

Professors

Gwilym S. Jones, PhD
Charles A. M. Meszoely, PhD
M. Patricia Morse, PhD
Fred A. Rosenberg, PhD
Ernest Ruber, PhD
Phyllis R. Strauss, PhD
Carol M. Warner, PhD

Associate Professors

Joseph L. Ayers, PhD
Kostia Bergman, PhD
Donald P. Cheney, PhD
Frederick C. Davis, PhD

H. William Detrich, PhD
Charles H. Ellis, Jr., PhD
Helen H. Lambert, PhD
Richard L. Marsh, PhD
Jacqueline M. Piret, PhD
Susan Powers-Lee, PhD
Daniel C. Scheirer, PhD
Wendy A. Smith, PhD
Jon D. Witman, PhD

Professors Emeriti

Francis D. Crisley, PhD
Charles Gainor, PhD
Nathan W. Riser, PhD

Adjunct Professors

Bruce B. Collette, PhD
Sergei Kashin, PhD

Adjunct Associate Professors

Dennis Bazylnski, PhD
Stephen Brecher, PhD

Adjunct Assistant Professor

Slava S. Epstein, PhD

By majoring in biology, students develop a basic understanding of the organization and the processes of life, from molecules and cells through organs and organ systems to populations, species, ecosystems, and evolution. The major offers the mathematical, chemical, and physical background necessary for understanding biology and the practical scientific skills associated with each of these areas. It allows students to begin to specialize in a subdiscipline of biology such as animal physiology, cell biology, ecology, marine biology/microbiology, molecular biology, plant biology, zoology, etc. Numerous opportunities for relevant positions are available through Northeastern's program of cooperative education.

Students who decide to major in biology in the freshman or sophomore year may follow the prescribed academic sequence; students who enter the major in the middler year may complete the major in the normal time by taking some electives concurrently with the biology core, or Biocore, courses. After completing the Biocore, students interested in independent research may arrange to undertake a more extensive honors program involving up to four quarters of research.

To graduate with a major in biology, a student must have a cumulative quality-point average (QPA) of 2.0 for all science and mathematics courses required for the major. The Bachelor of Arts and Bachelor of Science degrees require a modern language. The Bachelor of Science program is more extensive in its mathematics and science requirements and may offer better preparation for some areas of postgraduate study. The department publishes *The Biology Undergraduate Advisory Book*, which explains the required and recommended courses and the QPA standards for biology majors. The advisory book is available in the Department of Biology, 414 Mugar Hall.

The undergraduate biology major prepares students for careers in the life sciences, including medical, dental, and other health-related fields. Students may find employment in federal, state, industrial, hospital, or university laboratories or in industries involved in the manufacture and distribution of pharmaceuticals, biological products, food, or scientific equipment. Biologists also work in fisheries, forestry services, county and state agencies, museums, aquariums, research vessels, and marine stations.

Graduate study culminating in a master's or doctoral degree can lead to careers in upper-level teaching or research in any of the life sciences.

Premedical or pre dental students are urged to consult with the preprofessional advisory committee early in their careers at Northeastern.

Bachelor of Arts Curriculum

BIO 1103, BIO 1104, BIO 1105, Principles of Biology I, 2, and 3; BIO 1211, Environmental and Population Biology; BIO 1260, Genetics and Developmental Biology; BIO 1261, Introductory Biochemistry; and four advanced biology electives approved by department Advisory Committee.

MTH 1106, Fundamentals of Mathematics, MTH 1107, Functions and Basic Calculus, *or* Calculus (one year); PHY 1201, PHY 1202, and PHY 1203, Physics for the Life Sciences 1, 2, and 3, and PHY 1501, PHY 1502, Physics Lab for the Life Sciences I and 2, *or* PHY 1221 and PHY 1222, Physics for Science and Engineering Students 1 and 2, and PHY 1521 and PHY 1522, Physics Lab for Science and Engineering Students I and 2, *or* PHY 1223, Physics for Science and Engineering Students 3 and PHY 1523, Physics Lab for Science and Engineering Students 3; CHM 1111, General Chemistry I; CHM 1122, General Chemistry 2; CHM 1221, Analytical Chemistry; and CHM 1264, CHM 1265, Organic Chemistry I and 2.

In addition, complete the arts and sciences core curriculum (see page 31).

Bachelor of Science Curriculum

BIO 1103, BIO 1104, and BIO 1105, Principles of Biology 1, 2, and 3; BIO 1211, Environmental and Population Biology; BIO 1260, Genetics and Developmental Biology; BIO 1261, Introductory Biochemistry; BIO 1490, Senior Seminar; four advanced biology electives approved by department Advisory Committee.

Calculus (one year); PHY 1221, PHY 1222, and PHY 1223, Physics for Science and Engineering Students 1, 2, and 3; PHY 1531, PHY 1532, Physics Lab for Science Majors 1 and 2 or PHY 1523, Physics Lab for Science and Engineering Students 3; CHM 1111 and CHM 1122, General Chemistry 1 and 2; CHM 1221, Analytical Chemistry; CHM 1264 and CHM 1265, Organic Chemistry 1 and 2; and two additional advanced science electives approved by department Advisory Committee.

In addition, complete the arts and sciences core curriculum (see page 31).

Minor Curriculum

A minor in biology consists of any six biology courses for which the student has the prerequisites, plus two more courses in biology or other departments that serve as prerequisites for biology courses. At least five of the total eight courses must include laboratory, and a student may not count toward the biology minor more than one course, or course sequence, that covers substantially the same material.

To accommodate the needs of students majoring in different fields, the biology minor requirements have been phrased in a general and flexible way. To ensure that course selection is sound and appropriate to the student's background, each student's biology minor program must receive the signed approval of the biology minor advisor before the student has completed the first biology course.

Suggested course groupings for a biology minor have been developed for students with different backgrounds in college mathematics and science. The core minor for students with considerable work in mathematics, chemistry, or physics provides the foundation on which a biology major is built, without advanced specialization. For students with less college mathematics/science background, or none, three other minor options provide the opportunity for first-level exposure to the basic principles of biology. This option also gives students an opportunity to achieve some advanced specialization in plant and/or animal studies or to explore human biology, molecular biology, biochemistry, and the problems of the environment.

For further information, contact the biology minor adviser in 414 Mugar, 373-2260.

Chemistry

William M. Reiff, PhD, *Professor and Chair*

Professors

Geoffrey Davies, PhD
David A. Forsyth, PhD
Bill C. Giessen, DrScNat
Barry L. Karger, PhD
Philip W. LeQuesne, PhD, DSci
Mary Jo Ondrechen, PhD
John L. Roebber, PhD
Alfred Viola, PhD
Paul Vouros, PhD
Philip M. Warner, PhD

Associate Professors

Thomas R. Gilbert, PhD
Ira S. Krull, PhD
Kay D. Onan, PhD

Laboratory Coordinator

Edward H. Witten, PhD

Professor Emeritus

Robert F. Raffauf, PhD

Assistant Professors

David Budil, PhD
David J. Jebaratnam, PhD
Lutfur R. Khundkar, PhD
Rein U. Kirss, PhD
Patricia A. Mabrouk, PhD

The study of chemistry focuses on the structure and properties of substances and the transformations they undergo. The department seeks to help students experience the intellectual stimulation of studying a physical science; grasp the basic principles and techniques of chemistry; and prepare for graduate study in chemistry, medicine, dentistry, or many other related fields.

Students in our Cooperative Education program can obtain invaluable practical professional experience to augment their classroom work. For many, these practical applications help to put their course work into a logical framework and help provide perspective. Electives, especially in the last two years, allow students to concentrate in those areas which have a special interest for them. The department encourages qualified students to undertake a research project under the supervision of a faculty member. An honors program is open to particularly able students.

The department publishes *Chemistry at Northeastern*, a pamphlet that details the chemistry major requirements. Copies may be obtained from 102 Hurtig Hall.

There are two degrees offered in chemistry, the Bachelor of Science and the Bachelor of Arts. The Bachelor of Science degree has more explicit scientific course requirements, while the Bachelor of Arts degree has more extensive requirements outside of the sciences. Both of the programs at Northeastern are approved by the American Chemical Society. The Bachelor of Science degree meets the society's requirements for certification; certified graduates are eligible for full membership in the society after two years of professional experience.

Challenging career opportunities exist in technical fields involving research, development, production, sales, market analysis, quality control, and management. As a result of their co-op experiences, graduating students are unusually well prepared for the next step in their professional careers. Alumni have found positions in chemical sales; clinical, medicinal, pharmaceutical, and forensic chemistry; and geochemistry, mineralogy, and environmental chemistry.

Bachelor of Arts Curriculum

CHM 1151, CHM 1152, General Chemistry for Science Majors 1 and 2; CHM 1231, Analytical Chemistry for Chemistry Majors; CHM 1271, CHM 1272, CHM 1273, Organic Chemistry for Chemistry Majors and Chemical Engineering Students 1, 2, and 3; CHM 1381, CHM 1382, CHM 1383, Physical Chemistry 1, 2, and 3; CHM 1394, CHM 1395, CHM 1396, Experimental Physical Chemistry 1, 2, and 3; CHM 1422, Instrumental Methods of Analysis; and CHM 1432, Instrumental Analysis Lab.

MTH 1140, MTH 1141, MTH 1142, Calculus 1, 2, and 3; MTH 1243, Calculus and Linear Methods 1 or MTH 1223, Calculus 4; PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3; and PHY 1522, PHY 1533, Physics Lab for Science Majors 2 and 3.

In addition, complete the arts and sciences core curriculum (see page 31).

Bachelor of Science Curriculum

CHM 1151, CHM 1152, General Chemistry for Science Majors 1 and 2; CHM 1231, Analytical Chemistry for Chemistry Majors; CHM 1271, CHM 1272, CHM 1273, Organic Chemistry for Chemistry Majors and Chemical Engineering Students 1, 2, and 3; CHM 1381, CHM 1382, CHM 1383, Physical Chemistry 1, 2, and 3; CHM 1394, CHM 1395, CHM 1396, Experimental Physical Chemistry 1, 2, and 3; CHM 1422, Instrumental Methods of Analysis; CHM 1432, Instrumental Analysis Lab; CHM 1441, Advanced Inorganic Chemistry; CHM 1451, Experimental Inorganic Chemistry; CHM 1461, Identification of Organic Compounds; CHM 1811, Advanced Chemical Lab Practice 1; and two advanced science or mathematics electives.

MTH 1140, MTH 1141, MTH 1142, Calculus 1, 2, and 3; MTH 1243, Calculus and Linear Methods 1 or MTH 1223, Calculus 4; MTH 1245, Differential Equations and Linear Methods 1 or MTH 1225, Mathematical Analysis; PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3; and PHY 1522, PHY 1533, Physics Lab for Science Majors 2 and 3.

In addition, complete the arts and sciences core curriculum (see page 31).

Minor Curriculum

After a general chemistry sequence, CHM 1231, Analytical Chemistry for Chemistry Majors; CHM 1271, CHM 1272, CHM 1273, Organic Chemistry for Chemistry Majors and Chemical Engineering Students 1, 2, and 3; CHM 1381, CHM 1382, Physical Chemistry 1 and 2; and CHM 1394, CHM 1395, Experimental Physical Chemistry 1 and 2.

Communication Studies

Richard A. Katula, PhD, *Professor and Chair*

Associate Professors

Karen S. Buzzard, PhD
Carl W. Eastman, MA
Joanne Morreale, PhD
Michael L. Woodnick, MS
Alan J. Zaremba, PhD

Assistant Professors

Simon Jones, PhD
Anne Mattina, PhD

Instructors

Thomas Shaker, MA
Sherry Shepler, MA

Communication studies offers students a humanities-based, liberal arts education coupled with pre-professional training.

Students who major in communication studies learn to speak articulately and persuasively in a variety of situations, understand the history and traditions of the field of communication, and comprehend the business and technology of the communications industry. The program also helps students appreciate the aesthetics of human communication, communicate effectively in complex organizations such as businesses and government agencies, understand theories of human communication and research methods used to develop and support those theories, and effectively criticize and consume messages produced in public argument and mass communication media.

The department offers coursework in speech skill development, radio and television production and broadcasting, communication theories, and criticism.

Bachelor of Arts and Bachelor of Science Curriculum

CMN 1115, Foundations of Communication; CMN 1116, Public Speaking; CMN 1250, Introduction to Mass Communication; CMN 1300, Communication Theory; CMN 1330, Interpersonal Communication; CMN 1600, Introduction to Communication Research; and CMN 1610, Rhetorical Criticism.

In addition to the core courses, communication studies majors may choose from one of three concentrations: speech and rhetoric, organizational communication, and radio and television. Concentrations require five courses. In addition, three upper-level communication studies courses are required to complete the major.

Concentration in speech and rhetoric. CMN 1110, Voice and Articulation; CMN 1111, Oral Interpretation of Literature; CMN 1210, Advanced Voice and Articulation; CMN 1211, Advanced Oral Interpretation; CMN 1232, Communication and Gender; CMN 1239, Argumentation and Debate; CMN 1240, Advanced Studies in Speech Performance; CMN 1310, Classical Age in Speech and Rhetoric; CMN 1315, Theories of Persuasion; CMN 1410, Contemporary Public Address; CMN 1415, Persuasion in Contemporary Culture; and CMN 1500, Special Topics in Communication Studies.

Concentration in organizational communication. CMN 1232, Communication and Gender; CMN 1315, Theories of Persuasion; CMN 1318, Negotiation Skills; CMN 1331, Advanced Interpersonal Communication; CMN 1338, Group Discussion; CMN 1430, Organizational Communication; CMN 1431, Advanced Organizational Communication; CMN 1437, Consultation Skills; CMN 1453, Broadcast Management; CMN 1500, Special Topics in Communication Studies; CMN 1555, Communication and the Quality of Life.

Concentration in radio and television. CMN 1232, Communication and Gender; CMN 1315, Theories of Persuasion; CMN 1317, The Audience in Mass Communication; CMN 1415, Persuasion in Contemporary Culture; CMN 1430, Organizational Communication; CMN 1450, Television Studio Production; CMN 1451, Foundation of Broadcast Technology; CMN 1452, Radio Production; CMN 1453, Broadcast Management; CMN 1454, Programming for Radio and Television; CMN 1455, Television Field Production; CMN 1554, Special Topics in Media.

CMN 1895, CMN 1896, Internship in Communication Studies, and CMN 1890, CMN 1891, CMN 1892, Directed Study, may be taken for credit in any of the three concentration areas.

Minor Curriculum

CMN 1116, Public Speaking; CMN 1300, Introduction to Communication Theory; CMN 1330, Interpersonal Communication; and CMN 1338, Group Discussion.

Four courses from the following: CMN 1110, Voice and Articulation; CMN 1111, Oral Interpretation of Literature; CMN 1232, Communication and Gender; CMN 1239, Argumentation and Debate; CMN 1250, Introduction to Mass Communication; CMN 1318, Negotiation Skills; CMN 1331, Advanced Interpersonal Communication; CMN 1410, Contemporary Public Address; CMN 1415, Techniques of Persuasion; CMN 1437, Consultation Skills; CMN 1430, Organizational Communication; CMN 1600, Introduction to Communication Research; and CMN 1610, Rhetorical Criticism.

Economics

John Adams, PhD, *Professor and Chair*

Professors

M. Shahid Alam, PhD
Conrad P. Caligaris, PhD
Harold M. Goldstein, PhD
Irwin L. Herrnsstadt, PhD
Sungwoo Kim, PhD
Steven A. Morrison, PhD
Gustav Schachter, PhD
Andrew M. Sum, MA

Associate Professors

Neil O. Alper, PhD
Bruce R. Bolnick, PhD
Oscar T. Brookins, PhD
Kamran N. Dadkhah, PhD
Alan W. Dyer, PhD
Barbara M. Fraumeni, PhD
Gregory Wassall, PhD

Assistant Professors

Gopa Chowdhury-Bose, PhD
Jonathan H. Haughton, PhD
Manfred W. Keil, PhD
Katherine A. Kiel, PhD
Laraine V. Lomax, PhD
Stephen L. Parente, PhD
George A. Plesko, PhD

Professor Emeritus

Morris A. Horowitz, PhD

Economics is the study of how societies produce and exchange goods and services to satisfy material needs. Economists analyze the process of economic growth and change and identify policies that contribute to its success or failure.

In the economics program students examine the sources of economic growth—how societies produce more of what they need. Undergraduates study economics as part of a broad interest in the social sciences to develop specialized skills useful in today's complex labor market. The major in economics is a good foundation for graduate studies in advanced economics, public policy, law, or business.

Macroeconomics, which focuses on the overall economy, deals with such problems as inflation, unemployment, growth and instability, economic development, and governmental monetary and fiscal policies.

Microeconomics examines the economic behavior of individuals, households, firms, industries, and trade among countries. It seeks to assess the economic effects of market power and environmental damage and analyzes the economic aspects of natural resources, poverty, health, income distribution, trade unions, and government regulation.

Courses in economics cover international trade; the behavior of families, firms, and industries in the market economy; the environmental costs of growth; and the economic aspects of natural resources, poverty, health, labor market discrimination affecting women and minorities, trade

unions, and governmental oversight. International and comparative perspectives are emphasized, most directly in courses in economic development of the Third World and economic history.

Graduates may find jobs in federal, state, and local governments, major corporations, or financial institutions. Their work may involve planning and forecasting, assessing labor needs, and making financial studies. They may estimate consumer demand for new products, conduct research, teach, or provide specialized consulting services.

Bachelor of Arts Curriculum

ECN 1115, Principles of Macroeconomics; ECN 1116, Principles of Microeconomics; ECN 1250, ECN 1251, Statistics 1 and 2; ECN 1215, Macroeconomic Theory; ECN 1216, Microeconomic Theory; ECN 1337, History of Economic Thought; six economics electives. MTH 1113, College Mathematics for Business and Economics; MTH 1114, Calculus for Business and Economics; and four social science electives other than economics.

In addition, complete the arts and sciences core curriculum (see page 31).

Bachelor of Science Curriculum

ECN 1115, Principles of Macroeconomics; ECN 1116, Principles of Microeconomics; ECN 1250, ECN 1251, Statistics 1 and 2; ECN 1215, Macroeconomic Theory; ECN 1216, Microeconomic Theory; ECN 1350, Introduction to Econometrics or ECN 1351, Problems in Economic Research; and ten economics electives. MTH 1113, College Mathematics for Business and Economics; MTH 1114, Calculus for Business and Economics; and four social science electives other than economics.

In addition, complete the arts and sciences core curriculum (see page 31).

Minor Curriculum

ECN 1115, Principles of Macroeconomics; ECN 1116, Principles of Microeconomics; ECN 1215, Macroeconomic Theory; ECN 1216, Microeconomic Theory; and four electives in economics. Electives to be selected with the advice of a department adviser and cannot include ECN 1250, Statistics 1, or ECN 1251, Statistics 2, if comparable courses are required by the major department. Any course taken outside the Department of Economics to satisfy these economics elective requirements must be approved by a faculty adviser in the department.

Education

Maurice Kaufman, PhD, *Professor and Chair*

Professors

Mervin D. Lynch, PhD
Sandra M. Parker, EdD

Associate Professors

Nicholas J. Buffone, PhD
Leslie A. Burg, EdD
Mary J. Lee, MEd
Joseph Meier, EdD
Irene A. Nichols, EdD
Barbara A. Schram, EdD

Assistant Professor

Thomas H. Clark, MA

Professor Emeritus

John D. Herzog, PhD

The Department of Education helps students to understand principles of curriculum, instruction, and evaluation; to analyze and think critically about teaching and learning; to communicate effectively; and to understand the legal and moral responsibilities of the teaching profession. The department offers undergraduate programs that enable students to obtain provisional Massachusetts teacher certification, which is recognized in other states. (Full certification requires a master's degree.) All students who seek teaching certificates in Massachusetts need degrees that consist of a major in the arts and sciences and a program of study in education. Students acquire specified competencies established for certification in Massachusetts through designated courses, related fieldwork, cooperative education experiences, and full-time student teaching arranged by the education department.

Early Childhood Education and Elementary Education

Students who wish to obtain certification as early childhood or elementary education teachers should enroll in the education/arts and sciences dual-major program. Advisers help students plan appropriate programs that consist of a major in education, a major in the arts and sciences, and college core requirements. Students in this program are expected to participate in co-op and course-related fieldwork.

Elementary education major. CRS 1200 Introduction to Special Education; ED 1101, Education for the Future; ED 1102, Human Development and Learning 1; ED 1104, Analysis of the Instructional Process; ED 1306, Measurement and Evaluation; ED 1405, Literature and Learning Materials; ED 1406, ED 1407, Elementary Curriculum 1 and 2; ED 1417, Student Teaching and Seminar; ED 1425, Elementary School Science and Mathematics; ED 1426, Fundamentals of Reading; and HSL 1151, Movement Education.

Early childhood education major. CRS 1200, Introduction to Special Education; ED 1101, Education for the Future; ED 1102, Human Development and Learning 1; ED 1104, Analysis of the Instructional Process; ED 1105, Day Care and Nursery School; ED 1306, Measurement and Evaluation; ED 1318, Seminar in Early Childhood Development; ED 1319, Speech, Language and Cognition in the Young Child; ED 1405, Literature and Learning Materials; ED 1406, ED 1407,

	Elementary Curriculum 1 and 2; ED 1417, Student Teaching and Seminar; ED 1425, Elementary School Science and Mathematics; ED 1426, Fundamentals of Reading; and HSL 1265, Early Childhood Perceptual Motor Development.
Secondary Education	<p>Students seeking high-school teacher certification should enroll in an arts and sciences major and a minor in secondary education.</p> <p>Students preparing to teach biology, chemistry, earth science (geology), English, history, mathematics, physics, or foreign languages in Massachusetts schools should major in the pertinent field. Students majoring in economics, history, political science, or sociology may pursue certification in the teaching of social studies.</p> <p>Secondary education minor. CRS 1200, Introduction to Special Education; ED 1103, Human Development and Learning 2; ED 1104, Analysis of the Instructional Process; ED 1306, Measurement and Evaluation; ED 1410, ED 1411, Methods and Materials for Teaching Adolescents 1 and 2; ED 1412, Fundamentals of Curriculum Development; and ED 1417, Student Teaching and Seminar.</p>
Student Teaching	Student teaching is a full-time experience for one quarter of the senior year. A professor and a cooperating classroom teacher share supervisory responsibility.

English

Stuart S. Peterfreund, PhD, *Professor and Chair*

Professors

Samuel J. Bernstein, PhD
Robert J. Blanch, PhD
Francis C. Blessington, PhD
Irene Fairley, PhD
Gary Goshgarian, PhD
Earl N. Harbert, PhD
Guy Rotella, PhD
Michael Ryan, PhD

Herbert L. Sussman, PhD
Arthur J. Weitzman, PhD
Joseph E. Westlund, PhD
Kristin Woolever, PhD

Associate Professors

Timothy R. Donovan, PhD
Maryemma Graham, PhD
Janet Randall, PhD
Susan Wall, PhD

Assistant Professors

Kathy Howlett, PhD
Kathleen Kelly, PhD
Marina Leslie, PhD
Mary K. Loeffelholz, PhD
Linda Loehr, PhD

Lecturers

Joseph B. deRoche, MFA
David W. Tutein, MA

The department offers courses in creative, expository, and technical writing; linguistics; literary studies; and American and British literature.

Students who have completed the freshman English requirement and are in good academic standing may major or minor in English. The broad-based major requires proficiency in a number of approaches—including historical, generic, and theoretical—to the study of language and literature. The more narrowly focused minor gives students intensive exposure to literature, writing, linguistics, or technical communication.

English majors prepare for careers in teaching and research, advertising and publishing, radio and television—any field in which communication and critical judgment go hand in hand. The department also offers an intellectual and cultural framework for preprofessional students in law, medicine, business, engineering, or computer science.

Bachelor of Arts and Bachelor of Science Curriculum

ENG 1126, Backgrounds in English and American Literature; ENG 1120, ENG 1121, Survey of English Literature 1 and 2; ENG 1123, ENG 1124, Survey of American Literature 1 and 2; ENG 1307, Approaches to Literature; two period courses; three major figure courses (one must be Shakespeare); one language or writing course; one genre course; one alternative literature course; one junior/senior seminar; and three electives in English.

In addition, complete the arts and sciences core curriculum (see page 31).

Minor in Literature Curriculum

Six courses required, two from the following: ENG 1120, Survey of English Literature 1; ENG 1121, Survey of English Literature 2; ENG 1123, Survey of American Literature 1; ENG 1124, Survey of American Literature 2; one course from two of the following categories: (a) literary periods, (b) major figures, and (c) language and writing; one elective from (a), (b) or (c); a junior/senior seminar.

Minor in Writing Curriculum

Six courses required, four from the following: ENG 1350, Intermediate Writing; ENG 1351, Creative Writing; ENG 1125, Technical Writing 1; ENG 1370, Technical Writing 2; ENG 1352, Advanced Writing; ENG 1381, Writing for the Professions: Business Administration; ENG 1382, Writing for the Professions: Criminal Justice; ENG 1357, Poetry Workshop; ENG 1358, Fiction Workshop; ENG 1362, Publication Arts; ENG 1359, Nonfiction Workshop; and two writing or literature electives.

Minor in Linguistics Curriculum

See page 52.

Minor in Technical Communication Curriculum

See page 34.

Geology

Richard H. Bailey, PhD, *Professor and Chair*

Professors

Richard S. Naylor, PhD
William A. Newman, PhD

Associate Professors

Bernard L. Gordon, MS
Malcolm D. Hill, PhD
Peter S. Rosen, PhD
Martin E. Ross, PhD

Geology is a broad-based science that deals with the study of the physical features, composition, history, and processes of the earth. Many geologists today are working to solve environmental problems, to develop and protect water resources, and to discover new deposits of minerals and fossil fuels.

Bachelor of Science and Bachelor of Arts programs are offered in geology and in environmental geology. These programs require coursework in mathematics (through calculus), physics, and chemistry, and a set of required and elective geology courses. All students complete the College of Arts and Sciences core. Students in the Bachelor of Arts programs take a broader array of non-science courses and must demonstrate proficiency in a foreign language (through intermediate II level). Courses in the geology major focus on the basic composition (mineralogy and petrology), structure (structural geology and stratigraphy), and surface of the earth (geomorphology and geochemistry). The environmental geology major has a greater emphasis on earth surface processes, human interactions, and land-use planning. Typical environmental geology courses include hydrogeology, land-use planning, water in environmental planning, groundwater geochemistry, and coastal processes.

Fieldwork is an essential component of training in geology, and many of our courses utilize field sites throughout New England to demonstrate geological processes. In addition to these local trips, the department has taken students on longer field excursions to the Cascade Mountains of Washington, to the island of San Salvador in the Bahamas, and to the Black Hills of South Dakota. Students also have the option to complete undergraduate research courses with a faculty member. Undergraduate research projects usually involve substantial field and lab work completed under the guidance of the geology faculty. Honors students in geology have the opportunity to participate in special sections of geology courses and in special honors activities.

The geology program offers basic knowledge needed to work in almost any of the geologic professions in both industry and government, or to continue studies in graduate school. The major in environmental geology is particularly popular, and many of our recent graduates work for environmental or geotechnical firms. Students involved in the optional co-op plan typically work with local engineering or environmental consulting companies. These jobs often involve assessing building sites, evaluating land use, and studying many problems concerned with groundwater contamination and remediation.

Bachelor of Arts in Geology Curriculum

GEO 1212, Physical Geology; GEO 1213, Physical Geology Lab; GEO 1222, Historical Geology; GEO 1223, Historical Geology Lab; GEO 1310, Descriptive Mineralogy; GEO 1308, Petrology; GEO 1440, Geomorphology; GEO 1418, Structural Geology; and five geology electives.

MTH 1106, Fundamentals of Mathematics and MTH 1107, Functions and Basic Calculus *or* MTH 1107, Functions and Basic Calculus and MTH 1108, Calculus; PHY 1221, Physics for Science and Engineering Students *or* PHY 1201, Physics for the Life Sciences 1; CHM 1111, CHM 1122, General Chemistry 1 and 2.

In addition, complete the arts and sciences core curriculum (see page 31).

Bachelor of Science in Geology Curriculum

GEO 1212, Physical Geology; GEO 1213, Physical Geology Lab; GEO 1222, Historical Geology; GEO 1223, Historical Geology Lab; GEO 1310, Descriptive Mineralogy; GEO 1311, Optical Crystallography; GEO 1308, Petrology; GEO 1418, Structural Geology; GEO 1440, Geomorphology; and eight geology electives.

MTH 1107, Functions and Basic Calculus and MTH 1108, Calculus *or* MTH 1123, MTH 1124, and MTH 1125, Calculus 1, 2, and 3; PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3; CHM 1111, CHM 1122, General Chemistry 1 and 2; CHM 1221, Analytical Chemistry *or* GEO 1412, Geochemistry; and two approved additional science electives.

In addition, complete the arts and sciences core curriculum (see page 31).

Minor in Geology Curriculum

GEO 1212, Physical Geology; GEO 1222, Historical Geology; GEO 1308, Petrology; GEO 1213, Physical Geology Lab; GEO 1223, Historical Geology Lab; plus four geology electives (GEO 1250 or higher number) chosen with the approval of the geology department.

Bachelor of Arts in Environmental Geology Curriculum

GEO 1212, Physical Geology; GEO 1213, Physical Geology Lab; GEO 1222, Historical Geology; GEO 1223, Historical Geology Lab; GEO 1308, Petrology; GEO 1440, Geomorphology; GEO 1438, Geology and Land-use Planning; and five geology electives.

**Bachelor of Science in
Environmental Geology
Curriculum**

MTH 1107, Functions and Basic Calculus and MTH 1108, Calculus *or* MTH 1106, Fundamentals of Mathematics and MTH 1107, Functions and Basic Calculus; BIO 1103, BIO 1104, Principles of Biology 1 and 2; CHM 1111, CHM 1122, General Chemistry 1 and 2.

In addition, complete the arts and sciences core curriculum (see page 31).

GEO 1212, Physical Geology; GEO 1213, Physical Geology Lab; GEO 1222, Historical Geology; GEO 1223, Historical Geology Lab; GEO 1308, Petrology; GEO 1310, Descriptive Mineralogy; GEO 1440, Geomorphology; GEO 1438, Geology and Land-Use Planning; GEO 1442, Water in Environmental Planning; and eight geology electives.

MTH 1107, Functions and Basic Calculus; MTH 1108, Calculus; PHY¹ 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3 *or* BIO 1103, BIO 1104, BIO 1105, Principles of Biology 1, 2, and 3; CHM 1111, CHM 1122, General Chemistry 1 and 2; and CHM 1221, Analytical Chemistry *or* GEO 1412, Geochemistry; and two approved additional science electives.

In addition, complete the arts and sciences core curriculum (see page 31).

**Minor in Environmental
Geology Curriculum**

GEO 1212, Physical Geology *or* GEO 1140, Environmental Geology; GEO 1213, Physical Geology Lab; GEO 1222, Historical Geology; GEO 1223, Historical Geology Lab; GEO 1438, Geology and Land-Use Planning; plus four geology electives (GEO 1250 or higher number) chosen with the approval of the geology department.

History

William M. Fowler, Jr., PhD, *Professor and Chair*

Professors

Philip N. Backstrom, PhD
Ballard C. Campbell, PhD
Donald M. Jacobs, PhD
Patrick Manning, PhD
Anthony N. Penna, DA
Raymond H. Robinson, PhD

Associate Professors

Charmarie J. Blaisdell, PhD
Laura L. Frader, PhD
Harvey Green, PhD
Clay McShane, PhD

Assistant Professors

Christina Gilmartin, PhD
Gerald H. Herman, MA
Felix V. Matos Rodriguez, MA

A major in history, which examines humanity's diverse and complex past, provides students with an excellent opportunity to develop a greater understanding and appreciation of today's cultures and civilizations.

The department offers two degree programs: a Bachelor of Arts, for students preparing for graduate work in history or for teaching careers; and the Bachelor of Science, designed for students planning careers in public history fields or in the "new history" areas that require technical understanding of the social sciences.

All history majors are required to take courses in Western or world civilization, American history, and historical methodology, as well as a range of history electives that explore diverse periods and locales. Students finish the major with a seminar in Approaches to History, in which they complete a substantial research project that demonstrates both substantive and methodological expertise. Eligible students are encouraged to test themselves by doing an honors thesis. Students also have the opportunity, through directed study, to work on an individual basis with senior faculty on topics of mutual interest.

The major also provides students with opportunities to work as historians-in-training in diverse settings through cooperative education placements, fieldwork, internships, and other experiential learning activities. Students who use the major as a broad-based preparation for careers in business, law, journalism, or government have opportunities for relevant cooperative education experiences in the business and professional worlds.

Many history majors want to work directly in their field of study. Those who plan to teach in public school may combine history with education courses that can lead to state certification; those who plan to teach in private secondary schools need not be certified by state authorities. Teaching positions in colleges and universities require master's and doctoral degrees.

Many professional historians teach and write; others work in public archives, private historical societies, museums, government agencies, media, and restoration projects.

Bachelor of Arts Curriculum

HST 1101, Western Civilization to 1648 *or* HST 1121, World Civilization to 1648; *or* HST 1701, Western Civilization 1 (Honors); HST 1122, World Civilization since 1648 *or* HST 1102, Western Civilization since 1648 *or* HST 1702, Western Civilization 2 (Honors); HST 1201, The United States to 1877 *or* HST 1711, The United States to 1877 (Honors), and HST 1202, The United States since 1877 *or* HST 1712, The United States since 1877 (Honors); HST 1241, The Historian's Craft; HST 1805, Approaches to History; nine history electives distributed as follows: two courses in Group A (ancient, medieval, and early modern Europe); two courses in Group B (modern Europe); two courses in Group C (America); two courses in Group D (other regions); and one course in any of the above groups.

In addition, complete the arts and sciences core curriculum (see page 31).

Bachelor of Science Curriculum

HST 1101, Western Civilization to 1648 *or* HST 1121, World Civilization to 1648 *or* HST 1701, Western Civilization 1 (Honors); HST 1122, World Civilization since 1648 *or* HST 1702, Western Civilization 2 (Honors); HST 1102, Western Civilization since 1648; HST 1201 *or* HST 1711, The United States to 1877 (Honors); and HST 1202, The United States since 1877 *or* HST 1712, The United States since 1877 (Honors); HST 1241, The Historian's Craft; HST 1805, Approaches to History; eleven history electives distributed as follows: two courses in Group A (ancient, medieval, and early modern Europe); two courses in Group B (modern Europe); two courses in Group C (America); two courses in Group D (other regions); and three courses in any of the above groups.

A minor approved by the student's adviser; a statistics course (for example, PSY 1211, SOC 1320, or ECN 1250); and a computer course, preferably COM 1105.

In addition, complete the arts and sciences core curriculum (see page 31).

Minor Curriculum

Eight courses in history, two of which must be selected from the following: HST 1101, Western Civilization to 1648 *or* HST 1121, World Civilization to 1648 *or* HST 1701, Western Civilization 1 (Honors); HST 1102, Western Civilization since 1648 *or* HST 1122, World Civilization since 1648 *or* HST 1702, Western Civilization 2 (Honors); HST 1201, The United States to 1877 *or* HST 1711, The United States to 1877 (Honors); and HST 1202, The United States since 1877 *or* HST 1712, The United States since 1877 (Honors).

Human Services

Wilfred E. Holton, PhD, *Director and Associate Professor, Sociology/Anthropology*

Advisory Committee

Patricia Fetter, PhD

Louise LaFontaine, EdD

Lawrence Litwack, EdD
*Counseling Psychology,
Rehabilitation, and
Special Education*

Gordana Rabrenovic, PhD
Sociology/Anthropology

David A. Rochefort, PhD
Political Science

Barbara A. Schram, EdD

Education

Martha Wengert, MEd

Cooperative Education

Harold S. Zamansky, PhD
Psychology

Professor Emeritus

John D. Herzog, PhD

Human Services is an interdisciplinary major that combines psychology, sociology, education, political science, counseling, and other fields. Students take basic foundation courses, select specialization areas of their choice, and complete fieldwork internships in Boston area agencies. The major may lead to careers in the helping professions or to graduate programs in social work, counseling, rehabilitation, and law. Students who major in human services select specialization areas such as deaf studies, counseling, gerontology, adolescent issues, human services administration, drug and alcohol services, early childhood issues, special needs, and many more. Students prepare for positions in both public and private agencies including: casework in social service and welfare agencies; therapeutic treatment in mental health settings; rehabilitation counseling; parole and court outreach work in programs for delinquent youth; staff work in halfway houses, drug treatment institutions, and penal institutions; community organizing; services for the aging at home and in institutions; administration in human services agencies; evaluation and grant writing for social programs; and counseling and support for deaf clients through fluency in American Sign Language. Students in the major have special opportunities to participate in the Human Services Student Organization, and in the Fenway Project, which provides student volunteers to community agencies.

**Bachelor of Arts
Curriculum**

Prerequisite courses. SOC 1100, Introduction to Sociology *or* ED 1100, Education and Social Science; ED 1302, Human Services Professions; PSY 1111, PSY 1112, Foundations of Psychology 1 and 2 *or* ED 1102, ED 1103, Human Development and Learning 1 and 2; POL 1111, Introduction to American Government *or* other basic political science course; ECN 1115, Principles of Macroeconomics *or* ECN 1116, Principles of Microeconomics *or* other basic economics course.

Core courses. PSY 1211, Statistics in Behavioral Science 1 *or* SOC 1320, Introduction to Statistical Analysis *or* ED 1307, Introduction to Educational Statistics; PSY 1511, Experimental Design in Psychology *or* SOC 1321, Research Methods 1 *or* SOC 1324, Human Services Research and Evaluation; SOC 1240, Sociology of Human Services Organizations; PSY 1272, Personality 1; PSY 1373, Abnormal Psychology 1; CRS 1314, Introduction to Counseling; SPC 1338, Group Discussion *or* SPC 1330, Interpersonal Communication 1; ED 1310, Intervention Strategies; INT 1333, Senior Seminar.

Fieldwork. INT 1336, INT 1337, Field Experience in Human Services 1 and 2.

Additional courses. Three courses focused on social and community issues such as poverty and welfare, minority affairs, or special needs populations, chosen with the student's academic adviser; a six-course specialization with human services, chosen with the student's academic adviser; and five courses in a particular specialization within human services, chosen with the student's academic adviser.

In addition, complete the arts and sciences bachelor of arts core curriculum (see page 31).

**Bachelor of Science
Curriculum**

Prerequisite courses. Same as for the Bachelor of Arts curriculum.

Core courses. Same as for the Bachelor of Arts curriculum plus POL 1329, American Social Welfare Policy *or* SOC 1501, Social Policy and Social Intervention.

Additional courses. Three courses focused on social and community issues such as poverty and welfare, minority affairs, or special needs populations, chosen with the student's academic adviser; a six-course specialization with human services, chosen with the student's academic adviser; ED 1107, Beginning Computer Use *or* COM 1105, Computer Science and Its Applications.

In addition, complete the arts and sciences bachelor of science core curriculum (see page 31), plus another mathematics or science course.

**Specialization in Deaf
Studies**

Prerequisite, core and fieldwork courses as listed above. ASL 1101, ASL 1102, American Sign Language 1 and 2; ASL 1201, ASL 1202, Intermediate Sign Language 1 and 2; and one of the following: ASL 1211, Deaf Culture; ASL 1212, Deaf History; PSY 1363, American Sign Language Linguistics; *or* ASL 1401, American Sign Language Literature.

**Double Major in
Human Services and
Elementary Education**

Students can now major in Human Services and prepare themselves as beginning teachers at the elementary level, meeting the new requirements in Massachusetts. This program gives students a strong background in psychology, sociology, human services, and other fields of study along with skills in teaching. See a Human Services adviser or the chair of the Department of Education for the requirements of the double major.

**Minor in Human Services
Curriculum**

ED 1302, Human Services Professions; ED 1310, Intervention Strategies; INT 1336, Field Experience in Human Services 1; SOC 1240, Sociology of Human Services Organizations; and two human services specialization courses approved by a human services adviser.

Journalism

Nicholas Daniloff, MA, *Associate Professor and Director*

Associate Professor
William Kirtz, MS

Assistant Professors
Jerome M. Berger, MS
Kelley C. Chunn, MS
Charles F. Fountain, MS
Nancy Gallinger, MA
Andrew P. Jones, MS
James Ross, MS
William Smith, JD
Linda Conway Tompkins, MA

Professor Emeritus
LaRue W. Gilleland, MA

The School of Journalism prepares students for careers in news media and related fields. The skills it emphasizes—writing, editing, information gathering, photojournalism, and design and graphics—also have broad applications in numerous other disciplines.

The school offers four undergraduate concentrations: advertising, newspaper/print media, public relations, and radio/television news. Students may enroll in either a five-year cooperative education program or a four-year program without co-op. The school strongly advises students to obtain cooperative education experience.

The New England Press Association (NEPA), representing 350 newspaper publishers, maintains its office on the Northeastern campus. Students have the opportunity to attend seminars and conferences sponsored by NEPA and other organizations.

The school seeks to contribute to the existing body of knowledge in journalism and mass communications in areas that help news media practitioners and educators perform their jobs with increasing effectiveness. To that end the school sponsors professional workshops and seminars in cooperation with media and related agencies.

Graduates work for some of the world's best newspapers, radio and television stations, wire services, general and specialized magazines, public relations departments, and advertising agencies.

Each major will complete the journalism core and one of four concentrations.

JRN 1103, JRN 1104, Newswriting 1 and 2; JRN 1206, Editing; JRN 1250, Interpreting the Day's News; JRN 1301, Basic Photojournalism; JRN 1501, History of Journalism; JRN 1508, Law of the Press; and JRN 1512, Journalism Ethics and Issues.

Concentration in advertising. JRN 1350, Advertising Principles; JRN 1440, Design and Graphics; JRN 1451, Advertising Copy Writing; JRN 1552, Advertising Practice; and one journalism elective.

Concentration in newspaper/print media. JRN 1305, Techniques of Journalism; JRN 1432, Local Government Reporting; JRN 1440, Design and Graphics; JRN 1575, Publication Production and Management; and one journalism elective.

Concentration in public relations. JRN 1336, Public Relations Principles; JRN 1440, Design and Graphics; JRN 1460, Public Relations Problems; JRN 1561, Public Relations Practice; and one journalism elective.

Concentration in radio/television news. JRN 1320, Radio News Gathering and Writing; JRN 1421, Television Newswriting; JRN 1422, Television News Production; JRN 1890, Directed Study; and one journalism elective.

Additional requirements. ENG 1275, Grammar for Journalists; ENG 1110, ENG 1111, Freshman English 1 and 2. One course from this list: ENG 1120, Survey of English Literature 1; ENG 1121, Survey of English Literature 2; ENG 1123, Survey of American Literature 1; ENG 1124, Survey of American Literature 2; and one additional English or American literature elective. POL 1310, American Ideology; POL 1318, State and Local Government; HST 1201, United States to 1877; HST 1202, United States since 1877; ECN 1115, Principles of Macroeconomics; and one additional course in economics or business; MTH 1152, Statistical Thinking; PHL 1200, Introduction to Logic 1; PHL 1140, Social and Political Philosophy; two history electives; and COP 1135, Professional Development for Journalists. MUS 1109, Introduction to Art, Drama, and Music or one course from both of the following categories: (a) ART 1106, Introduction to Art; ART 1220, American Art; (b) MUS 1100, Introduction to Music; MUS 1101, Music as a Listening Experience.

Additional requirements for bachelor of arts. Three courses in science and/or math.

Additional requirements for bachelor of science. Two foreign language courses (at least up to Elementary II level) and four science or computer science courses. Two of the four science courses must be in biology, chemistry, and physics, and at least one of the science courses must be above the elementary level.

Students must also complete the arts and sciences core curriculum (see page 31).

Bachelor of Arts and Bachelor of Science Curriculum

Linguistics

Janet H. Randall, PhD, *Associate Professor, Linguistics and Coordinator of Linguistics Program*

Professors

Irene R. Fairley, PhD

English

Harlan Lane, PhD, Doc. ès

Lettres

Psychology

Joanne L. Miller, PhD

Psychology

Associate Professors

John N. Frampton, PhD

Mathematics

Michael R. Lipton, PhD

Philosophy and Religion

Marina McIntyre, PhD

Linguistics

Assistant Professors

Lisa Green, PhD

Linguistics

Nancy N. Soja, PhD

Psychology

Shari R. Speer, PhD

Psychology

Lynn M. Stephen, PhD

Anthropology

Adjunct Lecturers

Robin Barr, ABD

Linguistics

Wendy J. Wiswall, PhD

Linguistics

Linguistics—the science of language—focuses on such issues as how children learn to speak, how we understand and produce language, and how language ties people together. The field also explores how language is structured and represented in the mind, why some people are better than others at acquiring a second language, how sign languages differ from spoken languages, and how language variation and diversity affect education.

Six departments (ASL, English, Modern Languages, Philosophy and Religion, Psychology, and Sociology and Anthropology) collaborate to offer a comprehensive linguistics program. The major reflects the current research of linguists, sociologists, psychologists, language educators, and teachers of second languages.

Almost all the linguistics courses have been approved for the honors program, and many of the majors and minors are honors program students.

Linguistics students have interesting co-op and foreign study opportunities. Several students have taken advantage of international co-op or study abroad. Many students have taken co-ops as research assistants to linguistic scholars, especially in Northeastern's own psycholinguistics laboratories.

Students with backgrounds in linguistics have pursued advanced degrees in fields including law, cognitive science, education, English, interpreting, business, speech pathology, computer science, and linguistics itself. Other graduates have gone on to work in research, translation, special-education, business, computer science, and law.

Bachelor of Arts and Bachelor of Science Curriculum

ENG 1118, Introduction to Language and Linguistics; ENG 1401, Introduction to Syntax; LNL 1220, Introduction to Phonetics and Phonology; PHL 1215, Symbolic Logic; PSY 1262, Psychology of Language; SOA 1335, Language and Culture.

Five from the following (and other related courses by permission): AFR 1231, African-American English; AFR 1415, African Languages; ASL 1350, Linguistics of American Sign Language; ENG 1119, History of the English Language; ENG 1402, Grammars of English; ENG 1407, Semantics; ENG 1408, Topics in Linguistics; LNF 1250, History of the French Language; LNL 1235, Applied Linguistics; LNL 1236, Advanced Applied Linguistics; LNL 1240, Bilingualism; LNL 1260, Introduction to Romance Linguistics; LNS 1250, History of the Spanish Language; PHL 1440, Philosophy of Language; PSY 1263, Nonverbal Communication; PSY 1362, Child Language; PSY 1364, Cognition; PSY 1365, Language and the Brain; PSY 1562, Laboratory in Psycholinguistics; PSY 1564, Laboratory in Cognition.

Two from the following: ENG 1690, ENG 1691, Junior/Senior Seminar (linguistics, stylistics); PSY 1661, Seminar in Psycholinguistics; PSY 1662, Seminar in Cognition.

One from the following (in fieldwork, interpreting, teaching, etc.): ENG 1810, ENG 1811, Directed Study; LNG 1801, Directed Study; PHL 1800, Directed Study; PSY 1890, Directed Study; SOA 1800, Directed Study.

Second language requirement: Proficiency through Intermediate 2 level plus two advanced courses. The college language placement procedures determine proficiency in a second language.

In addition, complete the arts and sciences core curriculum (see page 31).

Bachelor of Science Curriculum

Same as the Bachelor of Arts, except that American Sign Language can count toward the second language proficiency requirement.

In addition, complete the arts and sciences core curriculum (see page 31).

Minor Curriculum

ENG 1118, Introduction to Language and Linguistics; one of the following: ENG 1401, Introduction to Syntax; LNL 1220, Introduction to Phonetics and Phonology; PSY 1262, Psychology of Language.

Four from the following (not taken above): AFR 1231, African-American English; AFR 1415, African Languages; ASL 1350, Linguistics of American Sign Language; ENG 1119, History of the English Language; ENG 1401, Introduction to Syntax; ENG 1402, Grammars of English; ENG 1407, Semantics; ENG 1408, Topics in Linguistics; ENG 1690/1691, Junior/Senior Seminar (linguistics, stylistics); ENG 1810/1811, Directed Study; LNF 1250, History of the French Language; LNG 1801, Directed Study; LNL 1220, Introduction to Phonetics and Phonology; LNL 1235, Applied Linguistics; LNL 1236, Advanced Applied Linguistics; LNL 1240, Bilingualism; LNL 1260, Introduction to Romance Linguistics; LNS 1250, History of the Spanish Language; PHL 1215, Symbolic Logic; PHL 1440, Philosophy of Language; PHL 1800, Directed Study; PSY 1262, Psychology of Language; PSY 1263, Nonverbal Communication; PSY 1362, Child Language; PSY 1364, Cognition; PSY 1365, Language and the Brain; PSY 1562, Laboratory in Psycholinguistics; PSY 1564, Laboratory in Cognition; PSY 1661, Seminar in Psycholinguistics; PSY 1662, Seminar in Cognition; PSY 1890, Directed Study; SOA 1335, Language and Culture; SOA 1800, Directed Study.

Mathematics

Richard D. Porter, PhD, *Professor and Chair*

Professors

Samuel J. Blank, PhD
 Bohumil Cenk, ScD
 Terence J. Gaffney, PhD
 Alberto R. Galmarino, PhD
 Maurice E. Gilmore, PhD
 Mark Goresky, PhD
 Arshag B. Hajian, PhD
 Anthony Iarrobino, PhD
 Venkatrama Lakshminbhai, PhD
 Marc N. Levine, PhD
 Fred S. Roberts, PhD
 Egon Schulte, PhD
 Jayant M. Shah, PhD
 Mikhail Shubin, PhD
 Gabriel Stolzenberg, PhD
 Chuu-Lian Terng, PhD
 Andrei V. Zelevinsky, PhD

Associate Professors

Mark Bridger, PhD
 Robert W. Case, PhD
 Stanley J. Eigen, PhD
 John N. Frampton, PhD
 Eugene H. Gover, PhD
 Samuel Gutmann, PhD
 Solomon M. Jekel, PhD
 Donald R. King, PhD
 Nishan Krikorian, PhD
 N. V. R. Mahadev, PhD
 Robert C. McOwen, PhD
 Mark B. Ranras, PhD
 Martin Schwarz, PhD
 Thomas O. Sherman, PhD
 Alexandru I. Suciu, PhD
 Gordana G. Todorov, PhD
 Jerzy M. Weyman, PhD

Assistant Professors

Florin Avram, PhD
 Jennie Hansen, PhD
 Christopher K. King, PhD
 Alex Martsinkovsky, PhD
 David Massey, PhD
 Carla B. Oblas, MS
 Samuel S. Stueckle, PhD

Lecturers

Jane E. Devoe, MS
 Robert A. Lupi, MS
 Peter J. Philliou, MS
 Steven W. Olson, ME

Professors Emeritus

Holland C. Filgo, PhD
 Jack Warga, PhD

Mathematics has become the foundation and a rich source of methods for most scientific and technological research. Mathematicians possess the skill to analyze the crucial features of diverse problems and to apply rigorous techniques to solve them.

The Bachelor of Arts degree requires at least thirteen mathematics courses and three physics courses, in addition to the study of a foreign language; it is appropriate for students who wish a broader liberal arts education. The Bachelor of Science degree requires at least sixteen mathematics courses and three physics courses but no foreign language study; it is more specialized, and it is recommended for those strongly interested in mathematics and science. The department also offers a minor degree in mathematics.

The major programs provide flexibility with elective courses. Students may take advantage of a range of interdisciplinary programs and may join a major in mathematics with one in such fields as computer science, physics, engineering (six different majors), chemistry, biology and economics.

Strong students are accepted in the honors program, and have the option to enroll in honors sections of several of their mathematics courses. All math majors may benefit from co-op opportunities in the scientific business in Boston and elsewhere. Almost every job involves mathematically stimulating work that enables students to find out how math is used in the world around us.

The increasing use of computers in calculus and other mathematics courses gives students significant computer experience. The Mathematics Computer Center, completed in early 1993, is the nucleus of a "mathematical culture" that links students to applications via computer.

Students planning to teach secondary-school mathematics must major in mathematics and take a specific minor in education, which includes coursework and student teaching.

Mathematical training may lead to opportunities in applied research (natural sciences, engineering, economics, management, computer science) as well as in mathematical research, teaching, or industry.

Bachelor of Arts Curriculum

MTH 1140, MTH 1141, MTH 1142, Calculus 1, 2, and 3; MTH 1243, MTH 1244, Calculus 4 and 5; MTH 1245, MTH 1246, Differential Equations 1 and 2; MTH 1238, Combinatorial Mathematics; MTH 1301, Linear Algebra; MTH 1311, Analysis 1; and three approved mathematics electives selected in consultation with an adviser.

PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3.

In addition, complete the arts and sciences core curriculum (see page 31).

Bachelor of Science Curriculum

MTH 1140, MTH 1141, MTH 1142, Calculus 1, 2, and 3; MTH 1243, MTH 1244, Calculus 4 and 5; MTH 1245, MTH 1246, Differential Equations 1 and 2; MTH 1238, Combinatorial Mathematics; MTH 1301, Linear Algebra; MTH 1311, Analysis 1; and six approved mathematics electives selected in consultation with an adviser.

PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering 1, 2, and 3.

In addition, complete the arts and sciences core curriculum (see page 31).

Minor Curriculum

Eight MTH courses, of which the following four are required: three courses in calculus (MTH 1140, MTH 1141, MTH 1142, or equivalent); and MTH 1238, Combinatorial Mathematics. (MTH 1137 and MTH 1237 together are permitted to substitute for MTH 1238. If this option is elected, then nine

courses are required for the minor.) The remaining four courses are selected with the assistance of a departmental adviser: a) two must be selected from MTH 1200 or higher courses, e.g., MTH 1225, MTH 1226, MTH 1230, *or* MTH 1384 (these two courses may be required by the student's major program); b) the other two must be selected from MTH 1301–1399 and may **not** be among those required by the student's major program (MTH 1384 cannot be counted by many engineering majors and MTH 1301 cannot be counted by computer science majors; MTH 1301 cannot be counted at all if MTH 1230 is already counted in "a," above).

Modern Languages

Holbrook C. Robinson, PhD, *Associate Professor and Chair*

Professors

Inez Hedges, PhD
Constance H. Rose, PhD

Associate Professors

Lillian Bulwa, PhD
Walter M. Gershuny, PhD
Juliette M. Gilman, PhD
Neil A. Larsen, PhD
Bonnie S. McSorley, PhD
Stephen A. Sadow, PhD
John Spiegel, PhD

Assistant Professor

Robert B. Modee, MA

The study of modern languages can benefit all students, regardless of their majors. The multicultural world in which we live requires increased communication among varied and often divergent cultures. Learning a new language and its culture enables students to cross cultural barriers and to achieve a more cosmopolitan, open-minded, and sensitive view of the world.

The rationale behind all the majors in the department is the same: to ensure that students become as fluent as possible in a given language, and to introduce them to the relevant culture of that language. For this reason, the students take a number of language classes as well as literature, cinema, and general civilization courses. In addition, students are urged to consider participating in international co-op, which prepares students to function on an everyday level in a foreign country.

The major in modern languages is available in French and Spanish; it is also possible with special departmental permission to pursue a major in Italian, Russian, and German. Where possible, it is preferable to minor in Italian, Russian, or German, since smaller numbers of advanced courses are routinely offered by the department in these languages than in French and Spanish. The majors in French and Spanish are outlined below.

A major in a modern language can form the basis for careers in teaching at the elementary, secondary, or college level; international business relations; high-tech fields; government service; journalism; library science; world affairs; travel; and community service, especially in Spanish-speaking areas.

Bachelor of Arts in French Curriculum

LNF 1201, Intensive Review of French, LNF 1202, LNF 1203, and LNF 1204, French Composition and Conversation 2, 3, and 4; LNF 1512, Masterpieces of Modern European Fiction; LNF 1231 and LNF 1232, Masterpieces of French Literature 1 and 2; LNF 1225, Introduction to the French Speaking World; LNF 1309, LNF 1310, LNF 1311 and LNF 1312, French Literature of the Nineteenth through Twentieth Centuries; ENG 1118, Introduction to Linguistics; and LNL 1260, Introduction to Romance Linguistics. As an ancillary course, students are encouraged to take at least one elective pertaining to France.

Bachelor of Arts in Spanish Curriculum

Group I: LNS 1203 and LNS 1204, Composition and Conversation 3 and 4. Group II (prerequisite LNS 1204): LNS 1231, LNS 1232, Masterpieces of Spanish Literature 1 and 2; LNS 1316, Latin American Literature 2. Group III: LNS 1500, Backgrounds of Spanish Culture *or* LNS 1501, Backgrounds of Latin American Culture. Group IV (prerequisites Groups I and II), take four: LNS 1301, Medieval Literature; LNS 1303, 15th and 16th Century Literature; LNS 1306, Golden Age Theater; LNS 1309, LNS 1310, 19th Century Literature 1 and 2; LNS 1311, LNS 1312, 20th Century Literature 1 and 2; LNS 1315, Latin American Literature 1; LNS 1506, Cervantes; LNS 1511, Caribbean Literature. Group V, open electives: LNL 1235, Applied Linguistics; LNL 1250, Introduction to Romance Linguistics; LNS 1260, History of the Spanish Language; LNS 1400, Spanish Seminar (topic varies); LNS 1510, Saints and Sinners; LNS 1512, Don Juan; LNS 1550 Spanish Civil Wars in Spanish Film. Ancillary courses: Two courses from the social sciences pertaining to Latin America, Latino Studies or Europe and one course in linguistic reasoning.

Minor Curriculum

Six advanced courses (above 104 level); two courses in composition and conversation; one of the Masterpieces of Literature series (1231, 1232); one culture course; and two electives.

Since the German, Italian, and Russian sections of the department have limited course offerings, students are advised to begin their study of these languages as early as possible, and to coordinate carefully their programs with their language adviser.

Music

David D. Sonnenschein, DMA, *Associate Professor and Chair*

Professors

Reginald W. Haché, ArtDip
Joshua R. Jacobson, DMA
Roland L. Nadeau, MM
Judith Tick, PhD

Associate Professors

William Lowe, MA
Dennis H. Miller, DMA

Assistant Professors

Susan Asai, PhD
Leonard L. Brown, PhD
Bruce Ronkin, DMA

Lecturers

Marjorie J. Atlas, MM
Paul Beadoin, MM
Douglas F. Durant, PhD

Virginia Eskin, BA
Leon C. Janikian, MM
Michael Manning, MM
Karen L. Pokross, EdM
Jeanne M. Segal, MM
Robert Ward, MM

Visiting Faculty

Allen G. Feinstein, MM

The music department approaches the study and performance of music from a global perspective. The multicultural treatment of the musical arts expands on Western civilization's achievements and affirms that the music of other civilizations, with different musical traditions, is equally worthy of performance and serious study.

The department offers three concentrations in the context of a broad liberal arts program. The music industry concentration is the first such undergraduate program in Boston. It is designed for students with an interest in artist management, marketing and promotion, contracting and legal issues, the recording process, and studio techniques. Developed in collaboration with Northeastern's College of Business Administration, the music industry concentration leads to a Bachelor of Science degree.

The two other concentrations lead to Bachelor of Arts degrees. The music literature concentration has a historical orientation, while the program in music literature and performance combines history with hands-on music making. Students must audition for the music literature and performance program. This program may be especially useful for students working toward a Massachusetts teaching certification, which now requires a dual major in education and another liberal arts program.

Through an exchange program, students may attend classes at the New England Conservatory of Music. Students also share an array of high-tech and multimedia equipment.

While some music courses are designed for music majors, the department also offers elective survey courses. Several of these courses fulfill the College of Arts and Sciences core curriculum requirement.

An extensive concert series offers a variety of performances by students, faculty, and guest artists. Students also have the opportunity to participate in our active choral groups, bands, and chamber ensembles.

Bachelor of Arts Curriculum

Concentration in music literature. MUS 1107, Principles of Music Literature; MUS 1200, Fundamentals of Theory; MUS 1201, MUS 1202, MUS 1203, MUS 1204, Music Theory 1, 2, 3 and 4; MUS 1241, Piano 1; MUS 1301, MUS 1302, Form and Analysis 1 and 2; MUS 1171, Computer Literacy for Musicians; MUS 1420, Cultural Traditions; MUS 1421, MUS 1422, MUS 1423, and MUS 1424, Historical Traditions 1, 2, 3 and 4. Also take HST 1102, Western Civilization 2.

In addition, complete the arts and sciences core curriculum (see page 31).

Concentration in music literature and performance. MUS 1107, Principles of Music Literature; MUS 1200, Fundamentals of Theory; MUS 1201, MUS 1202, MUS 1203, MUS 1204, Music Theory 1, 2, 3 and 4; MUS 1241, Piano 1; MUS 1301 and 1302, Form and Analysis 1 and 2; MUS 1461, Applied Music Lessons (taken six times); MUS 1171, Computer Literacy for Musicians; MUS 1420, Cultural Traditions; MUS 1421, MUS 1422, MUS 1423, and MUS 1424, Historical Traditions 1, 2, 3 and 4. Also take HST 1102, Western Civilization 2.

Students in both concentrations must participate in at least one Northeastern University performing ensemble during at least eight of their quarters on campus.

In addition, complete the arts and sciences core curriculum (see page 31).

Bachelor of Science Curriculum

Concentration in music industry. MUS 1107, Principles of Music Literature; MUS 1200, Fundamentals of Theory; MUS 1201, MUS 1202, MUS 1203, Music Theory 1, 2 and 3; MUS 1241, Piano 1; MUS 1171, Computer Literacy for Musicians; MUS 1420, Cultural Traditions; MUS 1421, MUS 1422, MUS 1423, and MUS 1424, Historical Traditions 1, 2, 3 and 4; MUS 1165 and MUS 1166, Music Industry 1 and 2; MUS 1365, Seminar in the Music Industry; and three of the following: MUS 1170, Music and Technology; MUS 1172, The Recording Studio; MUS 1173, The Recording Studio 2; MUS 1366, Copyright Law for the Musician; MUS 1367, Computer Applications in Music Business.

ECN 1115, Principles of Macroeconomics; ECN 1116, Principles of Microeconomics. One of the following three pairs of courses in descriptive and inferential statistics: MTH 1387 and 1390; ECN 1250 and 1251; POL 1301 and 1302. NGT 1115, Introduction to Business; ACC 1111, Introduction to Accounting. Two of the following business courses: FIN 1438, Introduction to Finance; MKT 1435,

Introduction to Marketing; HRM 1432, Organizational Behavior; MSC 1441, Operations Management; ENT 1330, Management of Smaller Enterprises. HST 1102, Western Civilization 2.

Students must participate in at least one Northeastern University performing ensemble during at least four of their quarters on campus.

In addition, complete the arts and sciences core curriculum (see page 31).

Minor Curriculum

General music track. MUS 1200, Fundamentals of Music; MUS 1201, Music Theory 1; MUS 1202, Music Theory 2; MUS 1241, Piano 1 *or* MUS 1209, Functional Piano; MUS 1100, Introduction to Music *or* MUS 1107, Principles of Music; and a music history course.

Music theatre track. MUS 1200, Fundamentals of Music; MUS 1201, Music Theory 1; MUS 1100, Introduction to Music; MUS 1211, Sightsinging; MUS 1244, Voice Class 1; INT 1110, American Musical Theatre *or* MUS 1132, Introduction to Opera; MUS 1100, Introduction to Music *or* MUS 1107, Principles of Music; and the following courses four times each: MUS 1261, Voice Lessons and MUS 1230, Chorus.

Music industry track. MUS 1200, Fundamentals of Music; MUS 1201, Music Theory 1; MUS 1165, Music Industry 1; MUS 1166, Music Industry 2; MUS 1241, Piano Class 1 *or* MUS 1209, Functional Piano; MUS 1100, Introduction to Music *or* MUS 1107, Principles of Music; MUS 1170, Music and Technology *or* MUS 1171, Computer Literacy for Musicians; and two approved music industry electives.

Philosophy and Religion

Susan M. Setta, PhD, *Associate Professor and Chair*

Professors

Walter L. Fogg, PhD
Stephen L. Nathanson, PhD

Associate Professors

William J. DeAngelis, PhD
Michael Lipton, PhD
Gordon E. Pruett, PhD

Lecturer

Michael C. Meyer, PhD

Philosophy addresses questions and theories related to art, religion, morality, society, and natural and social sciences. The study of philosophy challenges students to examine through critical reflection their beliefs in many areas.

Courses aim to provide students with an understanding of the methods and traditions of philosophical and religious thought. Through readings, discussion, and writing, students examine questions concerning the nature and validity of religious beliefs, moral judgments, and scientific theories as well as questions about values and social policy in such areas as law, medicine, and technology.

Coursework in philosophy can strengthen the student's work in other areas. Philosophy majors enter diverse careers, ranging from college-level teaching to law. The program strives to help students sharpen their critical abilities, thereby enhancing their preparation for graduate or professional study.

Religion Program

The department's religion courses help students acquire an understanding of religious experience in both its individual and cultural expressions. Classes look at specific religions as well as at the mythical, mystical, and cultural dimensions of religious experience. The department offers a philosophy major with a concentration in religious studies that provides a solid introduction to the field through courses in both philosophy and religion. Upper-level philosophy courses complement and support the religious studies concentration.

Bachelor of Arts and Bachelor of Science Curriculum

PHL 1225, Ancient Philosophy; PHL 1230, History of Modern Philosophy *or* PHL 1200, Introduction to Logic 1 *or* PHL 1215, Symbolic Logic; PHL 1400, Theory of Knowledge *or* PHL 1405, Metaphysics *or* PHL 1335, Moral Philosophy; one philosophy seminar; and eight philosophy electives.

In addition, complete the arts and sciences core curriculum (see page 31).

Minor Curriculum

PHL 1100, Introduction to Philosophy 1 *or* PHL 1105, Introduction to Scientific Method; PHL 1225, Ancient Philosophy *or* PHL 1230, History of Modern Philosophy; PHL 1200, Introduction to Logic 1 *or* PHL 1215, Symbolic Logic; one of the following: PHL 1142, Philosophy of Mind; PHL 1400, Theory of Knowledge; PHL 1405, Metaphysics; and PHL 1335, Moral Philosophy; and three philosophy electives.

Physics

Paul M. Champion, PhD, *Professor and Chair*

Professors

Ronald Aaron, PhD
 Petros N. Argyres, PhD
 Arun Bansil, PhD
 Alan H. Cromer, PhD
 William L. Faissler, PhD
 Marvin H. Friedman, PhD
 David A. Garelick, PhD
 Michael J. Glaubman, PhD
 Haim Goldberg, PhD
 Jorge V. José, PhD
 Robert P. Lowndes, PhD
 Robert S. Markiewicz, PhD
 Pran Nath, PhD
 Clive H. Perry, PhD
 Stephen Reucroft, PhD

Carl A. Shiffman, PhD
 Jeffrey B. Sokoloff, PhD
 Yogendra N. Srivastava, PhD
 Michael T. Vaughn, PhD
 Eberhard von Goeler, PhD
 Allan Widom, PhD
 Fa Yueh Wu, PhD

Associate Professors

George O. Alverson, PhD
 Jacqueline Krim, PhD
 Marie E. Machacek, PhD
 Srinivas Sridhar, PhD

Assistant Professors

Nathan Israeloff, PhD
 Alain S. Karma, PhD
 Tomasz Taylor, PhD

Professors Emeriti

Walter Hauser, PhD
 Bertram J. Malenka, PhD
 Eugene J. Saletan, PhD

Physics examines the fundamental principles that govern natural phenomena, ranging in scale from collisions of subatomic particles, through the behavior of solids, liquids, and biomolecules, to exploding stars and colliding galaxies.

The program aims to help students experience the intellectual stimulation of studying physics and astrophysics and the excitement of front-line research; understand the basic principles and techniques of physics-related careers; and prepare for graduate study in physics or related fields.

The department offers four levels of undergraduate courses: descriptive courses for non-science majors with limited mathematical background; general survey courses for students in scientific and engineering fields; advanced courses primarily intended for physics majors; and highly advanced courses primarily intended for prospective graduate students.

In addition to work in industrial, government, or high-technology laboratories in areas of applied physics, students may find opportunities in such fields as biophysics, computer science, geophysics, medical and radiation physics, and engineering. Many physics majors pursue advanced degrees in physics and related fields.

Bachelor of Arts Curriculum

PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3, and associated labs PHY 1521, PHY 1522, PHY 1533; PHY 1301, Intermediate Mechanics; PHY 1302, Electric and Magnetic Fields; three upper-level physics lecture courses, and three upper-level lab courses.

MTH 1140, MTH 1141, MTH 1142, Calculus 1, 2, and 3; MTH 1243, MTH 1244, Calculus 4 and 5; and one advanced mathematics elective.

In addition, complete the arts and sciences core curriculum (see page 31).

Bachelor of Science Curriculum

PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3, and associated labs PHY 1521, PHY 1522, PHY 1533; PHY 1301, Intermediate Mechanics; PHY 1302, Electric and Magnetic Fields; PHY 1303, Modern Physics; PHY 1304, Mathematical Physics; PHY 1305, Thermodynamics and Kinetic Theory; PHY 1401, Classical Mechanics; PHY 1402, PHY 1403, Electricity and Magnetism 1 and 2; PHY 1404, Wave Motion and Optics; and three upper-level lab courses.

MTH 1140, MTH 1141, MTH 1142, Calculus 1, 2, and 3; MTH 1243, MTH 1244, Calculus 4 and 5; MTH 1245, MTH 1246, Differential Equations 1 and 2; and five additional electives from those approved for majors in the following fields: physics, mathematics, computer science, chemistry, engineering, biology, and geology.

In addition, complete the arts and sciences core curriculum (see page 31).

Bachelor of Science in Applied Physics Curriculum

PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3, and associated labs; PHY 1521, PHY 1522, PHY 1533; PHY 1301, Intermediate Mechanics; PHY 1302, Electric and Magnetic Fields; PHY 1303, Modern Physics; PHY 1305, Thermodynamics and Kinetic Theory; PHY 1404, Wave Motion and Optics; PHY 1551 and PHY 1552, Electronics for Scientists 1 and 2; PHY 1555, Wave Lab; PHY 1557, Advanced Lab; and PHY 1561, Project Lab.

MTH 1140, MTH 1141, MTH 1142, Calculus 1, 2, and 3; MTH 1243, MTH 1244, Calculus 4 and 5; MTH 1245, MTH 1246, Differential Equations 1 and 2.

COM 1100, Fundamentals of Computer Science; COM 1101, Algorithms and Data Structures 1; and COM 1201, Data Structures 2. Four additional electives from those approved for majors in the following fields: physics, mathematics, chemistry, computer science, engineering, biology, and geology.

In addition, complete the arts and sciences core curriculum (see page 31).

Minor in Physics Curriculum

PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3, and three upper-level lecture or lab courses from the following list: PHY 1301, PHY 1302, PHY 1303, PHY 1304, PHY 1305, PHY 1401, PHY 1402, PHY 1403, PHY 1404, PHY 1411, PHY 1412, PHY 1413, PHY 1414, PHY 1415, PHY 1416, PHY 1551, PHY 1552, and PHY 1555.

Minor in Instrumentation for Science Curriculum

The minor offers experience in the use of common laboratory instruments, the taking and analysis of data, and elementary skills in electronics. A primary goal of the minor is to prepare the student to design and construct relatively small-scale purpose measurement instrumentation.

Required courses: PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3; PHY 1555, Wave Laboratory; and PHY 1551, PHY 1552, Electronics for Scientists 1 and 2.

Political Science

Suzanne P. Ogden, PhD, *Professor and Chair*

Professors

Michael A. Baer, PhD
Robert L. Cord, PhD
Robert E. Gilbert, PhD
David E. Schmitt, PhD

Distinguished Visiting Professor

Michael S. Dukakis, JD

Associate Professors

Christopher J. Bosso, PhD
L. Gerald Bursey, PhD
Minton F. Goldman, PhD
Eileen L. McDonagh, PhD
William F. S. Miles, PhD
John H. Portz, PhD
David A. Rochefort, PhD
Denis J. Sullivan, PhD

Assistant Professors

Leslie E. Armijo, PhD
William D. Kay, PhD
Richard A. Loverd, PhD
William G. Mayer, PhD
John F. Ross, PhD
Michael C. Tolley, PhD
Bruce A. Wallin, PhD

Undergraduates majoring in political science study political behavior, power, policies, values, and institutions. Students gain an awareness of the environment that shapes policies and a sensitivity to multicultural, gender, and racial issues implicit in policies, institutions, and values.

The department has concentrations in law and legal issues and in public administration and offers a range of courses on international relations, comparative politics, American politics, political philosophy, and public administration.

Approximately half the majors participate in the cooperative education program, with placements in state and federal government agencies, law firms, nonprofit institutions, and corporations. Most students complete either a co-op position or an internship with a congressional representative, a senator, a governor, or other elected public servant.

Students may also participate in extracurricular programs designed to expand their leadership ability, such as the Model United Nations, the Model Arab League, the student government, or the College Democrats or College Republicans. Many students study abroad in one of the college's international programs, such as the Irish Studies program, which includes an internship in the Irish Parliament. Qualified students may be selected for the honors program and join the activities of the political science honor society.

A major in political science helps prepare students for law school, graduate school, and careers in the government and the nonprofit sector, as well as for teaching, journalism, legislative or lobbying positions, public relations activities, and work in international corporations.

Bachelor of Arts Curriculum

POL 1110, Introduction to Politics; POL 1111, Introduction to American Government; POL 1112, Introduction to International Relations; POL 1113, Introduction to Foreign Governments and Societies; POL 1261, Public Administration; one political theory/thought course selected from the following: POL 1373, POL 1374 or POL 1378; and seven political science electives.

Six social science electives selected from at least three of the following areas: African-American studies, anthropology, economics, history, psychology (consult the political science department's approved psychology course list), and sociology.

In addition, complete the arts and sciences core curriculum (see page 31).

Concentration in law and legal issues. POL 1110, Introduction to Politics; POL 1111, Introduction to American Government; POL 1261, Public Administration; POL 1373, Pre-Modern Political Thought or POL 1374, Modern Political Thought or POL 1378, Contemporary Political Thought; six law-related political science electives; and four general political science electives.

Six social science electives selected from at least three of the following areas: African-American studies, anthropology, economics, history, psychology (consult the political science department's approved psychology course list), and sociology.

In addition, complete the arts and sciences core curriculum (see page 31).

Bachelor of Science Curriculum

POL 1110, Introduction to Politics; POL 1111, Introduction to American Government; POL 1112, Introduction to International Relations; POL 1113, Introduction to Foreign Governments and Societies; POL 1261, Public Administration; POL 1301, POL 1302, Research Methods 1 and 2; and one political theory/thought course selected from the following: POL 1370, POL 1373, POL 1374 or POL 1378; and six political science electives.

Six social science electives selected from at least three of the following areas: African-American studies, anthropology, economics, history, psychology (consult the political science department's approved psychology course list), and sociology.

In addition, complete the arts and sciences core curriculum (see page 31).

Concentration in law and legal issues. POL 1110, Introduction to Politics; POL 1111, Introduction to American Government; POL 1261, Public Administration; POL 1301, POL 1302, Research Methods 1 and 2; POL 1373, Pre-Modern Political Thought *or* POL 1374, Modern Political Thought *or* POL 1378, Contemporary Political Thought; six law-related political science electives; and two general political science electives.

Six social science electives selected from at least three of the following areas: African-American studies, anthropology, economics, history, psychology (consult the political science department's approved psychology course list), and sociology.

In addition, complete the arts and sciences core curriculum (see page 31).

Concentration in public administration. POL 1110, Introduction to Politics; POL 1111, Introduction to American Government; POL 1261, Public Administration; POL 1301, POL 1302, Research Methods 1 and 2; POL 1373, Pre-Modern Political Thought *or* POL 1374, Modern Political Thought *or* POL 1378, Contemporary Political Thought; six public administration electives; and two general political science electives.

Six social science electives selected from at least three of the following areas: African-American studies, anthropology, economics, history, psychology (consult political science department's approved psychology course list), and sociology.

In addition, complete the arts and sciences core curriculum (see page 31).

Minor Curriculum

Any two of the following courses: POL 1110, Introduction to Politics; POL 1111, Introduction to American Government; POL 1112, Introduction to International Relations; POL 1113, Introduction to Foreign Governments and Societies; POL 1261, Public Administration. Any five additional courses offered by the Department of Political Science for political science majors, including courses listed above that have not been selected to fulfill the above requirement.

Minor in International Politics Curriculum

POL 1112, Introduction to International Relations; POL 1113, Introduction to Foreign Governments and Societies; any five additional courses in international politics and/or comparative politics offered by the Department of Political Science.

Psychology

Leon J. Kamin, PhD, *Professor and Chair*

Professors

Norman Adler, PhD
Judith A. Hall, PhD
Stephen G. Harkins, PhD
Harlan L. Lane, PhD,
Doc. ès Lettres
Joanne L. Miller, PhD
Adam J. Reeves, PhD
Alexander A. Skavenski, PhD
James R. Stellar, PhD
Harold S. Zamansky, PhD

Associate Professors

Martin L. Block, PhD
Perrin S. Cohen, PhD
Charles Karis, PhD
Harry A. Mackay, PhD

Assistant Professors

David J. Bryant, PhD
Jane A. Bybee, PhD
Elizabeth Cole, PhD
C. Randall Colvin, PhD
Rhea T. Eskew, PhD
Frank Naarendorp, PhD
Nancy N. Soja, PhD
Shari R. Speer, PhD

Psychology is the study of human and animal behavior and the ways people think. An interdisciplinary science, psychology includes methods and knowledge derived from the other natural and social sciences.

The psychology curriculum explores such topics as how brain function determines behavior; how we see, hear, and learn; what constitutes abnormal personality; how people develop emotionally and cognitively; and how individuals work in groups. Through laboratory practice and experimentation, individual research projects, and small-group seminars, the program encourages critical evaluation of psychology's accomplishments and its future.

The Bachelor of Arts degree is intended for students who wish to pursue a broad liberal arts education that explores the humanities, the social sciences, and, to a lesser extent, the natural sciences. The Bachelor of Science degree is more specialized and is usually recommended for students who have a strong scientific interest in psychology and the natural sciences.

The psychology department offers honors sections of introductory psychology, as well as honors activities in other courses. All students are eligible for directed study courses, which are individualized study or research experiences under the supervision of a faculty member. Co-op placements are based in both community (often mental health) and laboratory settings.

A solid scientific background in psychology helps prepare students for careers in teaching, business, public service, or research and provides a foundation for graduate study in all areas of psychology, including clinical, as well as in law and medicine.

PSY 1110, Perspectives in Psychology 1 *or* PSY 1111, Foundations of Psychology 1; PSY 1112, Foundations of Psychology 2 *or* PSY 1113, Perspectives in Psychology 2; PSY 1211 and PSY 1212, Statistics in Behavioral Science 1 and 2. Students in PSY 1111 and PSY 1112 are normally required to participate as research subjects in experiments conducted by department faculty.

Two courses from the following: PSY 1271, Social Psychology; PSY 1272, Personality 1 *or* PSY 1373, Abnormal Psychology 1; and PSY 1241, Human Behavioral Development 1. Three courses from the following: PSY 1262, Psychology of Language *or* PSY 1364, Cognition; PSY 1231, Learning and Motivation; PSY 1351, Psychobiology; and PSY 1381, Sensation *or* PSY 1382, Perception.

Within the psychology department, students may concentrate their electives in a variety of subareas, including language and cognition; learning and motivation; personality and social psychology; sensory and psychobiology; or individual study. Students should see a department adviser regarding these concentrations.

Additional requirements for Bachelor of Arts: Four psychology electives; *either* three psychology labs *or* two psychology labs and one psychology directed study; one psychology seminar.

Additional requirements for Bachelor of Science: Seven psychology electives; *either* four psychology labs *or* three psychology labs and one psychology directed study; one psychology seminar. Four mathematics, science, or computer science courses beyond the core curriculum requirements. Also, one humanities course beyond the core curriculum requirements.

Students must also complete the arts and sciences core curriculum (see page 31).

PSY 1110, Perspectives in Psychology 1 *or* PSY 1111, Foundations of Psychology 1; PSY 1112, Foundations of Psychology 2 *or* PSY 1113, Perspectives in Psychology 2; and PSY 1211, PSY 1212, Statistics in Behavioral Science 1 and 2.

Two courses from the following: PSY 1271, Social Psychology; PSY 1272, Personality 1 *or* PSY 1373, Abnormal Psychology 1; PSY 1241, Human Behavioral Development 1; PSY 1262, Psychology of Language *or* PSY 1364, Cognition; PSY 1231, Learning and Motivation; PSY 1351, Psychobiology; and PSY 1381, Sensation *or* PSY 1382, Perception.

Four psychology electives.

**Bachelor of Arts and
Bachelor of Science
Curriculum**

Minor Curriculum

Sociology and Anthropology

T. Anthony Jones, PhD, *Associate Professor and Chair*

Professors

Arnold Arluke, PhD
Michael E. Brown, PhD
Morris Freilich, PhD
Christine Gailey, PhD
Debra R. Kaufman, PhD
Alan M. Klein, PhD
Elliott A. Krause, PhD
Jack Levin, PhD
Ronald J. McAllister, PhD
Felix M. Padilla, PhD
Earl Rubington, PhD

Associate Professors

Richard Bourne, PhD
Winifred Breines, PhD
Wilfred E. Holton, PhD
Maureen Kelleher, PhD
Thomas H. Koenig, PhD
Carol A. Owen, PhD
Judith Perrolle, PhD
Thomas M. Shapiro, PhD
Lynn Stephen, PhD

Assistant Professors

Michael Blim, PhD
Daniel R. Faber, PhD
Luis M. Falcon, PhD
Gordana Rabrenovic, PhD

Professor Emeritus

Morton Rubin, PhD

Sociology and anthropology provide the critical perspective needed for studying the social arrangements in which people live, in particular for understanding how societies function, for studying the conditions under which people change society, and for describing the modes and conditions of cooperation that make social life possible.

Courses in the program examine such areas as gender, race, class, cities, conflict, law and crime, multiculturalism and intercultural relations, technology and the environment, education, media, and the

comparative interdisciplinary analyses of societies. Many courses are directly relevant to majors in other fields, including economics, political science, philosophy, literature, criminal justice, and business.

A major in sociology or anthropology helps prepare students for careers in public or private service, including such fields as law, teaching, social work, administration or management, and research.

Bachelor of Arts in Sociology Curriculum

SOC 1100, Introduction to Sociology; SOA 1100, Peoples and Cultures; SOC 1320, Introduction to Statistical Analysis; SOC 1321, SOC 1322, Research Methods 1 and 2; SOC 1300, Classical Social Thought; SOC 1301, Current Social Thought; SOC 1310, Class, Power, and Social Change; two intermediate courses (1100 or 1200 level); two advanced courses (1300, 1400, or 1500 level); and one anthropology course beyond SOA 1100. Six electives in the social sciences other than sociology/anthropology.

In addition, complete the arts and sciences core curriculum (see page 31).

Bachelor of Science in Sociology Curriculum

SOC 1100, Introduction to Sociology; SOA 1100, Peoples and Cultures; SOC 1320, Introduction to Statistical Analysis; SOC 1321, SOC 1322, Research Methods 1 and 2; SOC 1300, Classical Social Thought; SOC 1301, Current Social Thought; SOC 1310, Class, Power, and Social Change; two intermediate courses (1100 or 1200 level); two advanced courses (1300, 1400, or 1500 level); and one anthropology course beyond SOA 1100. Six electives in the social sciences other than sociology/anthropology. Six additional electives.

In addition, complete the arts and sciences core curriculum (see page 31).

Minor in Sociology Curriculum

SOC 1100, Introduction to Sociology; any two courses from among the following: SOC 1321, Research Methods 1; SOC 1322, Research Methods 2; SOC 1300, Classical Social Thought; SOC 1301, Current Social Thought; any three-course specialization in sociology arranged between the student and adviser; and one additional 1300, 1400, or 1500 level course.

Bachelor of Arts in Anthropology Curriculum

SOA 1100, Peoples and Cultures; SOA 1104, Cultures of the World; SOC 1100, Introduction to Sociology; and at least three of the following: SOA 1335, Language and Communication; SOA 1125, Stones and Bones: Prehistory in the New World; SOA 1155, Individual and Culture; SOA 1301, Human Origins; SOA 1160, Sex, Sex Roles, and Family; SOA 1425, Cultural Survival; SOA 1146, Rural Workers in the Third World; SOA 1310, Global Markets and Local Cultures; SOA 1470, Myth and Religion; at least six additional anthropology courses; and one sociology elective beyond SOC 1100. Six electives in the social sciences other than sociology/anthropology.

In addition, complete the arts and sciences core curriculum (see page 31).

Bachelor of Science in Anthropology Curriculum

SOA 1100, Peoples and Cultures; SOA 1104, Cultures of the World; SOC 1100, Introduction to Sociology; and at least three of the following: SOA 1335, Language and Communication; SOA 1125, Stones and Bones: Prehistory in the New World; SOA 1155, Individual and Culture; SOA 1301, Human Origins; SOA 1160, Sex, Sex Roles, and Family; SOA 1310, Global Markets and Local Cultures; SOA 1425, Cultural Survival; SOA 1146, Rural Workers in the Third World; SOA 1470, Myth and Religion; at least six additional anthropology courses; and one sociology elective beyond SOC 1100. Six electives in the social sciences other than sociology/anthropology. Four additional electives.

In addition, complete the arts and sciences core curriculum (see page 31).

Minor in Anthropology Curriculum

SOA 1100, Peoples and Cultures; SOA 1104, Cultures of the World; SOA 1335, Language and Communication; SOA 1155, Individual and Culture; SOA 1160, Sex, Sex Roles, and Family; and any two-course specialization in anthropology arranged between the student and adviser.

Theatre

Del Lewis, MFA, *Associate Professor and Chair*

Professor

Mordecai S. Kaplan, MA

Associate Professors

Janet L. Bobcean, MFA

Jerrold A. Phillips, PhD

Assistant Professor

Nancy Kindelan, PhD

Clinical Lecturer

Theodore D. Janello, MA

The study of theatre—as performance, visual expression, text, theory, and history—explores the techniques of creatively imaging or re-imaging the experiences of society and of the individual.

The program at Northeastern balances production theory and practice. In the theatre production laboratory, students (majors and non-majors) are involved in experiential learning that synthesizes the ideas, theories, and practices studied in the classroom. All theatre majors participate in laboratory and public performances.

A theatre major may petition to enter one of three concentrations: performance, production, or generalist. Opportunities exist for independent projects, internships, and co-op experiences.

Theatre majors may pursue advanced study in graduate or professional programs, careers as theatre practitioners, or careers in theatre education.

Bachelor of Arts and Bachelor of Science Curriculum

THE 1100, Introduction to Theatre Arts; THE 1106, THE 1107, Theatre History 1 and 2; THE 1112, Dramatic Theory/Criticism; THE 1114, Masters of Theatre; THE 1149, Script Analysis; THE 1150, Acting 1 (majors section); THE 1180, Concepts of Direction; THE 1200, Stagecraft; THE 1212, Introduction to Theatrical Design; THE 1300, Acting 2; and THE 1800, THE 1801, THE 1802, and THE 1803, Practicum in Production 1, 2, 3, and 4. All theatre majors must take ENG 1658, Introduction to Shakespeare, in the college core curriculum.

All theatre majors should select the following courses in their *freshman* year: (fall quarter) THE 1100, Introduction to Theatre Arts and THE 1200, Stagecraft; (winter quarter) THE 1150, Acting 1 (majors section) and THE 1800, Practicum in Production 1; (spring quarter) THE 1212, Introduction to Theatrical Design and THE 1801, Practicum in Production 2.

After completing 32 quarter hours, theatre majors may choose to be theatre generalists or to concentrate in production or performance. Admission to a concentration is by petition or audition.

Theatre generalist. THE 1116, American Theatre or THE 1121, Contemporary Theatre; THE 1210, Scene Design 1; THE 1226, Lighting for the Stage; THE 1261, Costuming 1; THE 1505, Continental Drama; THE 1510, Twentieth Century Theatre; and four courses from the following group: THE 1140, Playwriting; THE 1160, Body Movement 1; THE 1280, Stage Makeup; THE 1284, Theatre Management; THE 1325, Musical Theatre Technique; or THE 1410, Technical Production.

Concentration in production. THE 1209, Theatrical Drafting; THE 1210, Scene Design 1; THE 1226, Lighting for the Stage; THE 1261, Costuming 1; THE 1284, Theatre Management; THE 1410, Technical Production; THE 1505, Continental Drama; THE 1510, Twentieth Century Theatre; and two courses from the following: THE 1213, Scene Design 2; THE 1225, Scene Painting; THE 1265, Pattern Drafting; THE 1280, Stage Makeup; THE 1400, Costuming 2; or THE 1430, Lighting 2. All production concentration majors must take electives ART 1101, Art History Since 1400 and ART 1124, Basic Drawing.

Concentration in performance. THE 1116, American Theatre or THE 1121, Contemporary Theatre; THE 1155, Voice for the Theatre; THE 1160, Body Movement 1; THE 1280, Stage Makeup; THE 1301, THE 1302, Acting 3 and 4; THE 1316, Acting for the Camera; THE 1325, Musical Theatre Technique; THE 1505, Continental Drama; and THE 1510, Twentieth Century Theatre. All performance concentration majors must take 4 quarter hours of dance/physical education electives (HSL).

All students must complete the arts and sciences core curriculum (see page 31).

Minor Curriculum

THE 1100, Introduction to Theatre Arts; THE 1106, THE 1107, Theatre History 1 and 2; THE 1150, Acting 1 (majors section) (winter quarter); THE 1180, Concepts of Direction; THE 1200, Stagecraft; THE 1212, Introduction to Theatrical Design; THE 1800, THE 1801, Practicum in Production 1 and 2; and one of the following: THE 1149, Script Analysis; THE 1210, Scene Design 1; THE 1226, Lighting for the Stage; THE 1261, Costuming 1; and THE 1300, Acting 2. Laboratory practice in technical theatre and performance, in conjunction with the casework, is required for the minor.

Music majors who wish to minor in musical theatre must take the following courses. THE 1100, Introduction to Theatre Arts; THE 1111, American Musical Theatre; THE 1149, Script Analysis; THE 1150 and THE 1300, Acting 1 and 2; THE 1160, Movement 1; THE 1325, Musical Theatre Technique; THE 1800, THE 1801, THE 1802, and THE 1803, Practicum in Production 1, 2, 3, and 4. Laboratory practice in technical theatre and performance, in conjunction with the coursework, is required.

Bouvé College of Pharmacy and Health Sciences

James J. Gozzo, PhD, *Dean*

Mehdi Boroujerdi, PhD, *Associate Dean for Pharmacy*

Patrick F. Plunkett, EdD, *Associate Dean for Academic Affairs*

Ena Vasquez-Nuttal, EdD, *Acting Associate Dean and Director of the Graduate School*

Anne M. Ahern, MEd, *Director of the Office of Student Services*

Nancy P. Warner, MS, *Academic Counselor*

Carol M. Konis, *Assistant to the Dean*

Barry Kass, MBA, *Director of Continuing Education and Development*

Cornelius B. O'Leary, MEd, *Director of Graduate Admissions*

The programs in Bouvé College of Pharmacy and Health Sciences combine cooperative education experiences with highly innovative academic curricula that are designed to meet the demand for well-educated pharmacists and allied health professionals. The college prepares students to become effective professional practitioners, enter graduate schools, and work in many areas responsible for the delivery of health care.

The college offers students a health-care education that features a curriculum of highly relevant and closely integrated basic courses in the physical, biological, behavioral, and administrative sciences; on-site involvement in clinical patient care; a cooperative education work program, including a pharmacy externship-internship period and clinical affiliations in physical therapy and other health professions; and a commitment to the search for and advancement of new and progressive concepts, ideas, and philosophies of education and professional practice.

Each of the programs offered by the college is accredited by the appropriate professional group. The college is a member of the American Association of Colleges of Pharmacy and the Association of Schools of Allied Health Professions.

Class Entrance Requirements

Listed below are the overall quality-point averages required for students to advance to the next rank and to graduate.

Sophomore	1.6
Middler	1.8
Junior	2.0
Senior	2.0
To graduate	2.0

In addition, students are required to attain a grade of C– or better in professional courses (CPS, MLS, PAH [except PAH 1135], PCL, PCT, PHP, PMC, and TOX); and a C or better in professional courses (ATP and PTH). A required course in which an F or W grade is received can be repeated only once. If a grade of D is not considered passing in a professional course, the course can be repeated only once.

Medical laboratory science special requirements. A grade of C– or better must be earned in each professional course (MLS) in the program. To enter professional courses in the sophomore year, you must obtain a minimum quality-point average of 2.0 in all science courses, including mathematics, chemistry, biology, and basic medical laboratory science. To enter professional courses in the middler year, you must have a minimum quality-point average of 2.0 and have earned a C– or better in all professional courses. To enter clinical studies in the junior and senior years, you must have a minimum quality-point average of 2.5 and have earned a C– or better in all professional courses.

To be eligible for graduation, a baccalaureate degree candidate must have completed the specified curriculum with a minimum quality-point average of 2.5 and have earned a C– or better in all professional courses.

Cardiopulmonary sciences special requirements. In addition to the general grade requirement of at least a C– in all professional courses (CPS), students are required to maintain a quality-point average of at least 2.0 in the following professionally related courses to enter quarter 6: BIO 1120, BIO 1140, CHM 1111, CHM 1122, MTH 1107, PAH 1202, PAH 1204, and PHY 1201.

Toxicology special requirements. A grade of C or better is required in each toxicology course. A cumulative quality-point average of 2.0 is required for graduation. Professional electives cannot be taken on a pass/fail basis. An average of 2.5 or better overall is required of all students transferring into the program.

Physical therapy special requirements. During the first two years, physical therapy students must achieve a grade of C or better in each of the prerequisite sciences as well as in each professional course; all deficiencies, if any, must be cleared before a student may progress into the middle year. Beginning with quarter 6, students must achieve a grade of C or better in each professional course to progress to the next academic quarter. In addition, specific academic requirements govern performance in the physical therapy program and department.

Athletic training special requirements. A grade of C or better must be earned in each professional course in the program. A minimum quality point average of 2.0 is required for field experience.

Open Option Program

The Open Option Program is designed for students who are undecided about a profession but are interested in a career in health care. The program offers freshmen a core of courses designed to provide the basic scientific background for each of the professional programs in the college in addition to a one quarter-hour health careers seminar.

Satisfactory completion of all freshman-year courses, including the Open Option core curriculum, is necessary for admission to one of the professional programs of the college. The Open Option plan does not apply to the dental hygiene, pharmacy, and physical therapy programs.

Transfer Credit

The college may accept qualified transfer students who have successfully completed one or more years of preprofessional coursework in an accredited college or university. No student transferring from another college or university may receive a degree unless the last three quarters of academic work immediately preceding graduation have been completed at Northeastern.

Athletic Training

Chad A. Starkey, PhD, *Program Director*

Faculty listed under Physical Therapy

The five-year Bachelor of Science in education program is designed for students interested in careers as athletic trainers. Working under a physician's supervision, athletic trainers are members of the sports medicine field who specialize in the prevention, treatment, and rehabilitation of athletic injuries.

The athletic trainer's duties include advising on proper conditioning techniques to help reduce the chance of injury, assessing the severity of injuries that do occur, applying appropriate treatment to aid the healing process, and supervising post-injury rehabilitation programs. Athletic trainers work with secondary school, college, and professional athletic teams and may be employed in private clinics.

Students may petition for acceptance into the athletic training program after successfully completing their first year of academic study. To be accepted into the program, applicants must maintain at least a 2.0 quality-point average during their first year. Students must achieve a grade of C (2.0) or better in all professional courses and all basic science courses. In order to complete the athletic training program, students must complete a minimum of 1,000 hours' work with athletic teams in approved settings.

The program is approved by the National Athletic Trainers Association. Students who graduate from the athletic training program are eligible to sit for the National Athletic Trainers Association Certification Examination. Upon passing the examination, an individual may apply for Massachusetts licensure as an athletic trainer.

Bachelor of Science Curriculum

Quarter 1	CHM 1111, General Chemistry 1; COM 1105, Computer Science and Its Applications; ENG 1110, Freshman English 1; and MTH 1106, Fundamentals of Mathematics.
Quarter 2	ATP 1000, Introduction to Athletic Training; BIO 1152, Integrated Human Anatomy and Physiology 1; CHM 1112, General Chemistry 2; and ENG 1111, Freshman English 2.
Quarter 3	BIO 1153, Integrated Human Anatomy and Physiology 2; PSY 1111, Foundations of Psychology 1; SOC 1100, Introduction to Sociology; and one elective.
Quarter 4	ATP 1100, Prevention and Care of Athletic Injuries; ATP 1101, Athletic Training Laboratory; BIO 1154, Integrated Human Anatomy and Physiology 3; PHY 1201, Physics for the Life Sciences 1; PHY 1501, Physics Lab; and one elective.
Quarter 5	ATP 1200, Clinical Athletic Training; PHY1202, Physics for the Life Sciences 2; PTH 1250, Functional Anatomy and Biomechanics 1; and one elective.
Quarter 6	ATP 1300, Advanced Athletic Training 1; CRS 1314, Introduction to Counseling; PSY 1112, Foundations of Psychology 2; and PTH 1300, Functional Anatomy and Biomechanics 2.
Quarter 7	ATP 1350, Advanced Athletic Training 2; ATP 1390, Athletic Training Practicum 1; PTH 1600, Neuroscience; Middler-Year Writing Requirement; and one elective.
Quarter 8	ATP 1400, Therapeutic Modalities; ATP 1490, Athletic Training Practicum 2; CPS 1612, Exercise Physiology; and HSL 1468, Overview of Disabilities.

Quarter 9	ATP 1500, Therapeutic Reconditioning; ATP 1590, Athletic Training 3; MTH 1150, Probability, Statistics and the Computer; HSL 1286, Nutrition; and one elective.
Quarter 10	ATP 1600, Organization and Administration of Athletic Training; ATP 1690, Athletic Training Practicum 4; PTH 1405, Research for Physical Therapists; and SOC 1195, Drugs in Society.
Quarter 11	ATP 1800, Senior Seminar; one health elective; and two general electives.

Cardiopulmonary Sciences

Mary E. Watson, EdD, RRT, *Associate Professor and Chair*

Associate Professors

Thomas A. Barnes, EdD, RRT
Marilyn A. Cairns, ScD
William J. Gillespie, EdD
Patrick F. Plunkett, EdD, RRT
Donald Schneider, PhD

Assistant Clinical Specialist

Colt L. Murphy, EdD

The Bachelor of Science degree program in the Department of Cardiopulmonary Sciences offers a common core curriculum in arts and sciences and cardiopulmonary sciences, as well as an opportunity to concentrate in cardiovascular technology, exercise physiology, or respiratory therapy.

Seminar courses in the first and second year are designed to give students information about professional options within the field of cardiopulmonary sciences so that they may make informed decisions about their specialization.

Cardiovascular Technology

The program in cardiovascular technology helps prepare students to assist cardiologists in performing diagnostic and interventional cardiac catheterizations, cardiac electrophysiology studies, pacemaker implantations, research protocols, and noninvasive testing such as echocardiography and nuclear imaging.

Before these procedures, the cardiovascular technologist prepares the instrument table, the procedure site, and the patient for the physician while maintaining sterile techniques at all times; attaches instruments for obtaining hemodynamic measurements throughout the procedure; and supplies all desired catheters, wires, sheaths, balloons, and devices needed by the physician.

During the procedures, the cardiovascular technologist is usually responsible for operating monitoring equipment and obtaining vital measurements from the patient, performing calculations from data, and informing physicians of any abnormal measurements or any changes in pressures or electrocardiograms. The cardiovascular technologist must be able to adapt preparations and procedures to meet the requirements of the individual case while maintaining the flexibility to deal with different situations.

All students in the cardiovascular technology specialization study fundamentals of cardiovascular technology, advanced cardiovascular technology, imaging modalities, echocardiography, clinical seminars, and clinical practice courses.

Most cardiovascular technologists work in hospitals as part of the health-care team. Others pursue biomedical research positions in companies or health-care facilities. Graduates are eligible for the registry examination for cardiovascular technology given by the National Society for Cardiopulmonary Technology. Upon successful completion of the exam, an individual is designated a Registered Cardiovascular Technologist (RCVT).

Exercise Physiology

An exercise physiologist develops, implements, and coordinates exercise programs and administers exercise tests, usually under the supervision of a physician. A clinical exercise physiologist assesses the patient's status, prescribes appropriate exercise, and counsels and educates patients with cardiovascular, pulmonary, and/or metabolic diseases.

All students in the exercise physiology specialization take courses in exercise physiology, exercise testing, prescription and programming, clinical kinesiology, cardiopulmonary assessment, electrocardiography, organization and administration of rehabilitation programs, and practicum experiences in exercise physiology. Students may then choose an emphasis in either experimental exercise physiology or noninvasive cardiovascular technology. Students concentrating in experimental exercise physiology take courses in organic chemistry and biochemistry, physics, and calculus. Students who focus on noninvasive cardiovascular technology take courses in echocardiography and imaging modalities and complete a cardiovascular technology practicum.

Exercise physiology is an emerging and expanding profession within the health services industry. Exercise physiologists are employed in hospitals and outpatient clinics or in corporate and commercial centers in health promotion, wellness, fitness, and rehabilitation programs.

The American College of Sports Medicine has developed certification programs for professionals in the clinical areas of cardiovascular and pulmonary rehabilitation and in the health and fitness field. Graduates from the exercise physiology program are eligible to sit for either the exercise specialist or exercise test technologist certifications in the clinical area or the health fitness instructor certification in the health and fitness field.

Respiratory Therapy

Respiratory therapy is instrumental in the diagnosis, treatment, management, and preventive care of patients with cardiopulmonary problems. Patients suffering from a variety of acute or chronic disabling conditions may be found in newborn nurseries, surgical and medical units, emergency rooms, outpatient departments, and intensive care units.

Respiratory therapists are involved in treating disorders such as cardiac failure, asthma, pulmonary edema, emphysema, cerebral thrombosis, drowning, hemorrhage, and shock. The respiratory therapist is a life-support specialist trained in airway management, artificial ventilation, external cardiac massage, and other sophisticated emergency support measures.

Working under physicians' orders, respiratory therapists carry out specific therapeutic measures. They must provide and recommend specialized care and be skilled in such areas as medical gas administration; humidification, aerosols, and intermittent positive pressure breathing (IPPB); chest physiotherapy; cardiopulmonary resuscitation; mechanical ventilation; airway management; pulmonary function studies; blood gas analysis; and physiologic monitoring.

All students in the respiratory therapy specialization take several respiratory therapy didactic, laboratory, seminar and clinical practice courses.

After successful completion of the program, students are eligible to take the respiratory therapy registry examination administered by the National Board for Respiratory Care. Those who pass the exam earn the classification Registered Respiratory Therapist (RRT). The program is accredited by the Committee on Allied Health Education and Accreditation of the American Medical Association.

**Bachelor of Science in
Cardiopulmonary Science
Curriculum**

Quarter 1	CHM 1111, General Chemistry 1; COM 1105, Computer Science and Its Applications, CPS 1111, Cardiopulmonary Sciences Seminar 1; ENG 1110, Freshman English 1; and PSY 1111, Foundations of Psychology.
Quarter 2	BIO 1140, Animal Biology 1; CHM 1112, General Chemistry 2A or CHM 1122, General Chemistry 2B; CPS 1112, Cardiopulmonary Sciences Seminar 2; HSL 1282, Wellness; and SOC 1100, Introduction to Sociology.
Quarter 3	BIO 1120, Microbiology; CPS 1114, Basic Life Support; ENG 1111, Freshman English 2; MTH 1107, Functions and Basic Calculus; and one arts and sciences elective.
Quarter 4	PAH 1202, Anatomy & Physiology 1; PHY 1201, Physics for the Life Sciences 1; PHY 1501, Physics Lab; one humanities elective; and one open elective.
Quarter 5	CPS 1113, Cardiopulmonary Sciences Seminar 3; MTH 1150, Probability, Statistics, and the Computer; PAH 1204, Anatomy & Physiology 2; PHL 1165, Moral Problems in Medicine; and one humanities elective.

**Cardiovascular
Technology Curriculum**

Additional Courses: Cardiopulmonary Physiology; Pathophysiology; Physics for Life Sciences; Nutrition; Cardiopulmonary Disease; Writing for the Health Professions; Exercise Physiology 1; Research Design; Counseling and Teaching; Pharmacology; Electrocardiography; Cardiopulmonary Assessment; Fundamentals of Cardiovascular Technology; Clinical Seminars; Medical Monitoring; Advanced Cardiovascular Technology; Cardiovascular Technology Practicum 1 and 2; Imaging Modalities; Echocardiography; Advanced Cardiac Life Support; and arts and sciences electives.

**Exercise Physiology
Curriculum**

Additional Courses: Cardiopulmonary Physiology; Clinical Kinesiology; Pathophysiology; Physics for the Life Sciences; Nutrition; Cardiopulmonary Disease; Writing for the Health Professions; Exercise Prescription and Program; Exercise Physiology 1, Research Design; Counseling and Teaching; Cardiopulmonary Assessment; Electrocardiography; Pharmacology; Clinical Practicum 1, 2 and 3; Medical Monitoring; Exercise Physiology; Clinical Seminars; Administrative Rehabilitation Programs; Advanced Cardiac Life Support; and electives.

**Respiratory Therapy
Curriculum**

Additional Courses: Cardiopulmonary Physiology; Pathophysiology; Physics for the Life Sciences; Nutrition; Cardiopulmonary Disease; Writing for the Health Professions; Exercise Physiology 1; Research Design; Counseling and Teaching; Introduction to Respiratory Care; Professional Practice Laboratories; Pharmacology; Cardiopulmonary Assessment; Electrocardiography; Practicum in Respiratory Care 1, 2, 3 and 4; Medical Monitoring, Respiratory Care for the Medical and Surgical Patient; Advanced Cardiac Life Support; and electives.

Dental Hygiene

Linda Hanlon, RDH, BS, MEd, *Dean*

M. Barbara Schulze, RDH, BS, MEd, *Associate Dean and Registrar*

Judith S. Harvey, CDA, BA, MEd, *Director of Admissions*

The Forsyth School of Dental Hygiene conducts a program of dental hygiene education in cooperation with Northeastern University. Students attend classes at both the Forsyth Dental Center and Northeastern. The dental hygienist is the "preventive oral health professional licensed in dental hygiene, who provides educational, clinical, and therapeutic services supporting total health through the promotion of optimal oral health." In other words, the dental hygienist is that member of the oral health team who is responsible for the preventive aspects of dental treatment.

Graduates receive the Certificate in Dental Hygiene from the Forsyth School and the Associate in Science or Bachelor of Science in dental hygiene from Northeastern University. Graduates must satisfy the state dental hygiene licensure requirements before they may practice.

These programs are accredited by the Commission on Dental Accreditation of the American Dental Association, an accrediting body approved by the Department of Education and the Council on Post Secondary Accreditation.

Application should be made directly to the Forsyth School of Dental Hygiene, Office of Admissions, 140 The Fenway, Boston, MA 02115. For an application and a copy of the college catalogue, write that office or call 617-262-5200, extension 211, 212, or 213, FAX 617-262-4021.

Bachelor of Science Curriculum

Quarter 1	BIO 1115, Introduction to Human Biology; DHY 1100, Oral Anatomy and Histology; ENG 1110, Freshman English 1; MTH 1106, Functions and Algebra; and PSY 1111, Foundations of Psychology 1.
Quarter 2	CHM 1111, General Chemistry for Life Science 1; DHY 1104, Dental Procedures 1; ENG 1111, Freshman English 2; and SOC 1100, Introduction to Sociology.
Quarter 3	BIO 1120, Basic Microbiology; CHM 1112, Chemistry for Life Sciences 2A; DHY 1105, Dental Procedures 2; and one Northeastern University elective.
Quarter 4	BIO 1150, Human Anatomy and Physiology; DHY 1204, Head and Neck Anatomy; DHY 1211, Dental Hygiene Theory 1; DHY 1220, Radiology 1; and DHY 1611, Clinical Dental Hygiene 1.
Quarter 5	BIO 1151, Human Anatomy and Physiology 2; DHY 1208, Periodontology; DHY 1212, Dental Hygiene Theory 2; DHY 1221, Radiology 2; DHY 1240, Nutrition; and DHY 1612, Clinical Dental Hygiene 2.
Quarter 6	DHY 1206, Pathology 1; DHY 1213, Dental Hygiene Theory 3; DHY 1228, Dental Materials; DHY 1613, Clinical Dental Hygiene 3; PHP 1303, Interpersonal Skills for Health Professionals; and one Northeastern University elective (optional).
Quarter 7	DHY 1307, Pathology 2; DHY 1314, Dental Hygiene Theory 4; DHY 1330, Pharmacology; DHY 1614, Clinical Dental Hygiene 4; and MTH 1152, Statistical Thinking.
Quarter 8	DHY 1315, Dental Hygiene Theory 5; DHY 1331, Pain Control; DHY 1361, Public Health; DHY 1615, Clinical Dental Hygiene 5; and one Northeastern University elective.
Quarter 9	DHY 1316, Dental Hygiene Theory 6; DHY 1362, Community Health; DHY 1364, Law and Ethics; DHY 1616, Clinical Dental Hygiene 6; and one Northeastern University elective.
Quarter 10	DHY 1301, Introduction to Oral Health Research; DHY 1401, Oral Health Gerontology; ENG 1125, Technical Writing 1; and one Northeastern University elective.
Quarter 11	DHY 1402, Advanced Public Health; PAH 1135, Professional Dynamics in the Health Care Delivery System; and two Northeastern University electives.
Quarter 12	DHY 1403, Dental Seminars; DHY 1410, Independent Study; and DHY 1550, Internship.

Associate in Science Curriculum

Quarter 1	BIO 1150, Human Anatomy and Physiology 1; DHY 1100, Oral Anatomy and Histology; DHY 1204, Head and Neck Anatomy; DHY 1211, Dental Hygiene Theory 1; DHY 1220, Radiology 1; and DHY 1611, Clinical Dental Hygiene 1.
Quarter 2	BIO 1151, Human Anatomy and Physiology 2; DHY 1208, Periodontology; DHY 1212, Dental Hygiene Theory 2; DHY 1221, Radiology 2; DHY 1240, Nutrition; and DHY 1612, Clinical Dental Hygiene 2.
Quarter 3	BIO 1120, Basic Microbiology; DHY 1206, Pathology 1; DHY 1213, Dental Hygiene Theory 3; DHY 1228, Dental Materials; and DHY 1613, Clinical Dental Hygiene 3.
Quarter 4	DHY 1307, Pathology 2; DHY 1314, Dental Hygiene Theory 4; DHY 1330, Pharmacology; DHY 1614, Clinical Dental Hygiene 4; and ENG 1110, Freshman English 1.
Quarter 5	DHY 1315, Dental Hygiene Theory 5; DHY 1331, Pain Control; DHY 1361, Public Health; DHY 1615, Clinical Dental Hygiene 5; and PSY 1111, Foundation of Psychology 1.
Quarter 6	DHY 1316, Dental Hygiene Theory 6; DHY 1362, Community Health; DHY 1364, Law and Ethics; DHY 1616, Clinical Dental Hygiene 6; ENG 1111, Freshman English 2; and SOC 1100, Introduction to Sociology.

Health Information Administration

The Health Information Administration Program, formerly offered through the full-time day undergraduate college, will be offered through our evening division, University College. The program will be offered as an accelerated or part-time program. For further information, call 617-373-2818.

Medical Laboratory Science

Edward W. Schroder, M (ASCP), PhD, *Associate Professor and Chair*

Clinical Coordinator

Barbara E. Martin, MT (ASCP), CLS (NCA), MHP, *Program Director for Accredited Programs*

Laboratory Coordinator

Judith Baronas, MT (ASCP), BS

Professor

James J. Gozzo, PhD

Associate Professors

Judith T. Barr, CLS (NCA), ScD

Britta L. Karlsson, MT (ASCP), MS

Assistant Professor

Panayiota Araszkievich, PhD

The Department of Medical Laboratory Science prepares professionals in the laboratory disciplines of clinical chemistry, hematology, immunohematology, immunology, and microbiology. Medical laboratory scientists (medical technologists) perform diagnostic test procedures using state-of-the-art computerized analyzers. They are responsible for overseeing patient specimen collection, and for test accuracy, cost-effectiveness, and efficiency in reporting results to physicians. Physicians rely on laboratory tests to establish a diagnosis and to determine therapy. Traditionally the program has prepared students for positions in health-care delivery, but, through cooperative education experiences, it also offers students the opportunity to explore positions in biological research, the biotechnology industry, and governmental agencies. Many graduates enter responsible positions in these areas. The curriculum also provides excellent preparation for advanced studies in graduate and professional schools.

The five-year program leads to a Bachelor of Science degree. Students begin the experiential learning phase of the program during their sophomore year, with cooperative education placements in regional institutions. Upper class students have the opportunity for international placements. Recently students have had co-ops in Sweden and England. In their junior and senior years students receive formal clinical training at some of metropolitan Boston's finest health-care facilities. To enter clinical training students must complete all prerequisite courses and maintain an acceptable quality-point average. Graduates of the Bachelor of Science program are eligible for national certification examinations as medical technologists and clinical laboratory scientists. Some states require additional licensure examinations.

The department also offers a three-year Associate in Science program that culminates in eligibility for national certification examinations at the level of medical or clinical laboratory technician. Students may use this option to enter the medical laboratory profession. Qualified students may apply associate degree coursework toward subsequent studies for the baccalaureate degree.

Bachelor of Science Curriculum

Quarter 1	BIO 1106, General Biology; CHM 1111, General Chemistry 1; ENG 1110, Freshman English 1; MLS 1101, MLS Orientation 1; MTH 1106, Fundamentals of Mathematics <i>or</i> MTH 1107, Functions and Basic Calculus.
Quarter 2	BIO 1107, Animal Biology; MLS 1102, MLS Orientation 2; MLS 1112, Renal Physiology and Urinalysis; MLS 1212, Urinalysis Lab; PAH 1135, Professional Dynamics in Health Care Delivery; and one elective.
Quarter 3	CHM 1122, General Chemistry 2; ENG 1111, Freshman English 2; MLS 1123 Hematology 1; MLS 1223, Hematology 1 Lab; MLS 1172, Basic Immunology; and one computer elective.
Quarter 4	CHM 1264, Organic Chemistry 1; MLS 1124, Basic Hematology 2; MLS 1224, Basic Hematology Lab; MLS 1142, Basic Microbiology 1; MLS 1242, Basic Microbiology 1 Lab; PAH 1210, Anatomy and Physiology; and one optional elective.
Quarter 5	CHM 1265, Organic Chemistry 2; MLS 1132, Immunohematology; MLS 1232, Immunohematology Lab; MLS 1144, Basic Clinical Microbiology 2; MLS 1244, Basic Clinical Microbiology 2 Lab; PAH 1212, Anatomy and Physiology; and one elective.
Quarter 6	BIO 1260, Genetics and Developmental Biology; MLS 1152, Clinical Chemistry; MLS 1252, Clinical Chemistry Lab; MLS 1621, Advanced Hematology; MLS 1623, Special Topics: Hemostasis; PHY 1201, Physics 1; and PHY 1501, Physics 1 Lab.
Quarter 7	BIO 1261, Cell Physiology and Biochemistry; ENG 1340, Writing Workshop; MLS 1654, Advanced Clinical Chemistry 1; PHY 1202, Physics 2; PHY 1502, Physics 2 Lab; and a statistics courses.

Quarter 8	MLS 1631, Advanced Immunohematology; MLS 1648, Advanced Clinical Microbiology; MLS 1655, Advanced Clinical Chemistry 2; MLS 1672, Immunopathology; and one elective.
Quarter 9	MLS 1532, Immunohematology MT Applied Study; MLS 1552, Clinical Chemistry MT Applied Study; and MLS 1573, Clinical Immunology MT Applied Study 1.
Quarter 10	MLS 1523, Hematology MT Applied Study; MLS 1544, Clinical Microbiology MT Applied Study; MLS 1574, Clinical Immunology MT Applied Study 2; and MLS 1890, Undergraduate Research (optional).
Quarter 11	HRA 1580, Training and Development; MLS 1662, Clinimetrics; MLS 1665, Medical Laboratory Management; MLS 1681, Senior Seminar; and two electives.

Minor Curriculum

This minor provides students majoring in other science fields an opportunity to explore the principles of the biological and chemical sciences as applied in the medical laboratory. Students may specialize in one of the five categorical areas of MLS: clinical chemistry, hematology, immunology, immunohematology, or microbiology. Four to five MLS courses are required for each minor. Upon completing the categorical minor, the student will be eligible for categorical national certification examination. Interested students must contact the MLS minor adviser in 206 Mugar to select appropriate courses. Prerequisites: General Chemistry 1 and General Biology for all except students specializing in clinical chemistry.

Pharmacy

Department of Pharmaceutical Sciences

Robert N. Hanson, PhD, *Professor and Chair*

Professors

Mehdi Boroujerdi, PhD
Richard C. Deth, PhD
Roger W. Giese, PhD
James J. Gozzo, PhD
Ban An Khaw, PhD

Associate Professors

Norman R. Boisse, PhD
Ralph H. Loring, PhD
Robert A. Schatz, PhD
Edward W. Schroder, PhD
Barbara L. Waszczak, PhD

Assistant Professors

Mansoor Amiji, PhD
Jonathan Freedman, PhD
Gerald S. Jones, PhD
Eric J. Mack, PhD

Lecturer

Eric S. Hall, PhD

Department of Pharmacy Practice

Mehdi Boroujerdi, PhD, *Professor and Interim Chair*

Professor

Gerald E. Schumacher,
PharmD, PhD

Associate Professors

Robert J. Cersosimo, PharmD
Louise G. Cohen, PharmD
Gerald R. Donehew, PhD
Samuel J. Matthews, PharmD

Assistant Professor

Raafat A. Seifeldin,
PharmD, PhD

Assistant Clinical Specialist

Todd A. Brown, BS

Pharmacists prepare and dispense the drugs prescribed by physicians. Hospital and clinical pharmacy and institutional practice have attracted many practitioners and represent the fastest-growing areas of the profession. The increased use of the pharmacist as a drug consultant to medical and nursing staffs has broadened the scope of professional opportunity and given practitioners greater involvement as part of the health-care team.

Pharmacy also offers careers in research, manufacturing, government, law enforcement, and education. Many graduates of the pharmacy program go on to leading graduate and professional schools.

The college offers a five-year curriculum leading to the Bachelor of Science in pharmacy degree. The curriculum offers a blend of academic classroom and cooperative education experiences. The undergraduate pharmacy program subscribes to the standards established by the American Council on Pharmaceutical Education and the American Association of Colleges of Pharmacy.

Candidates for the Bachelor of Science in pharmacy degree must complete all prescribed courses—a minimum of 227 quarter hours. Students must maintain an overall quality-point average of C (2.0) and a C average in required pharmacy courses. They must meet the requirements of the Department of Cooperative Education to be eligible for the degree.

Pharmacists must meet certain requirements to obtain a license from the state in which they want to practice. These requirements ordinarily include graduating from an accredited college of pharmacy, passing an examination given by a state board of pharmacy, and completing an internship or apprenticeship.

The internship is a period of supervised practical experience in a preceptor pharmacy. This requirement is generally satisfied during the cooperative education periods, which commence during the student's second academic year. Students may apply up to 400 hours of the required academic clinical clerkship experience to their internship requirements. In addition, a college-directed externship adds to the total practice-oriented portion of the curriculum.

Pharmacy requires a significant amount of patient contact. Counseling by the pharmacist is considered essential to the effective and safe use of medications. Community pharmacy offers the opportunity to combine specialized pharmaceutical training with skills in management, business administration, and marketing. In addition to the patient contact and counseling, community pharmacists also spend considerable time discussing health-related matters with the prescribing physicians. Hospital and clinical pharmacists have the opportunity to apply clinical skills on a day-to-day basis; they may accompany other health-care professionals on ward rounds and consult with physicians on individual therapeutic regimens. Opportunities are expanding for pharmacists elsewhere. Health maintenance organizations (HMOs) and private groups, nursing homes and retirement complexes, the Public Health Service, health facilities, the armed services, and law enforcement agencies such as the Federal Drug Enforcement Administration all require pharmacists. Other graduates find employment in drug production or marketing with pharmaceutical industries, colleges of pharmacy, or in journalism. A growing number of pharmacy graduates seek additional professional training in pharmaceutical sciences, medicine, dentistry, or law.

Bachelor of Science Curriculum

Quarter 1	BIO 1106, General Biology; CHM 1111, General Chemistry 1; MTH 1106, Fundamentals of Mathematics <i>or</i> MTH 1107, Functions and Basic Calculus; PHP 1100, The Profession of Pharmacy; and one arts and sciences elective.
Quarter 2	BIO 1107, Animal Biology; ENG 1110, Freshman English 1; MTH 1107, Functions and Basic Calculus <i>or</i> MTH 1108, Calculus; and PAH 1135, Professional Dynamics in Health Care Delivery.
Quarter 3	CHM 1122, General Chemistry 2B; ENG 1111, Freshman English 2; MTH 1108, Calculus <i>or</i> an open elective; and one arts and sciences elective.
Quarter 4 (Entire class) (Sept.–Dec.)	CHM 1268, Organic Chemistry 1; PCT 1240, Pharmaceutical Calculations <i>or</i> PAH 1202, Anatomy and Physiology 1; PHY 1201, Physics 1; and one arts and sciences elective.
Quarter 4A (Entire class) (Jan.–March)	CHM 1269, Organic Chemistry 2; PAH 1202, Anatomy and Physiology 1 <i>or</i> PCT 1240, Pharmaceutical Calculations; PHY 1203, Physics 3; and one arts and sciences elective.
Quarter 5 (April–June and June–Sept.)	COM 1105, Computer Science and Its Applications; ENG 1340, Writing Workshop; PAH 1204, Anatomy and Physiology 2; PAH 1280, Biochemistry; and PHP 1303, Interpersonal Skills for Health Professionals.
Quarter 6	PCT 1310, Pharmaceutics Lab 1; PCT 1340, Pharmaceutics 1; PHP 1411, Pathophysiology; PMC 1322, Pharmaceutical Biotechnology; and PMC 1419, Pharmacology/Medicinal Chemistry 1.
Quarter 7	BIO 1121, Microbiology; PCL 1420, Pharmacology/Medicinal Chemistry 2; PCL 1451, Pharmacology Lab; PCT 1320, Pharmaceutics Lab 2; and PCT 1350, Pharmaceutics 2.
Quarter 8	PCL 1422, Pharmacology/Medicinal Chemistry 3; PCT 1440, Biopharmaceutics/Pharmacokinetics; PHP 1301, Pharmaceutical Jurisprudence; and PMC 1421, Antiinfectives.
Quarter 9 (Entire Class) (April–June)	PHP 1401, Drug Information and Evaluation; PHP 1441, Therapeutic Drug Monitoring; PHP 1601, Nonprescription Medication; and PHP 1609, Pharmacotherapeutics.
Quarter 10 (Summer/ Winter)	PHP 1302, Pharmacy Administration 1; PHP 1304, Social Pharmacology; PHP 1402, Parapharmaceuticals; PHP 1503, Professional Practice Lab; one professional elective; and one arts and sciences elective.
Quarter 10A (Fall/Spring)	PHP 1305, Hospital Pharmacy Management <i>or</i> PHP 1306, Community Pharmacy Management; TOX 1300, Clinical Toxicology; one professional elective; and one arts and sciences elective.
Quarter 11	PHP 1501, Community Pharmacy Externship.
Quarter 12	PHP 1505, Hospital Externship and PHP 1506, Clinical Clerkship.

Entry-Level PharmD

The College intends to implement a PharmD entry-level tracking curriculum in Fall 1994. The new program will be offered to a limited number of Northeastern University pharmacy junior students. Students entering the Pharmacy Program in Fall 1994 will have the opportunity to track into the entry-level PharmD program in their junior year, contingent upon their maintaining a QPA of 3.5 or better.

Physical Therapy

Meredith H. Harris, EdD, *Associate Professor and Acting Chair*

Associate Professors

Janice S. Bruckner, PhD
David A. Lake, PhD
Robert Sikes, PhD

Assistant Professors

Chad A. Starkey, PhD,
*Program Director,
Athletic Training*
Shirley Stockmeyer, MA
Makoto Tsuchiya, MS

Senior Clinical Specialist

Lisa M. Giallonardo, MS, OCS

Associate Clinical Specialists

Cindy I. Buchanan, MS
Pauline C. Hamel, MEd

Assistant Clinical Specialists

Ann L. Charrette, MS, PCS
Julia A. DeMaria, MS
Nancy L. Kiernan, MPT
Sonya L. Larrieux, MA
Mary O'Brien, MPH
Nancy H. Sharby, MS

Lecturer

Margaret E. Stacey, MS

The physical therapy program prepares its graduates to provide quality patient care in a time of changing concepts, trends, and challenges. Students learn to help clients gain functional independence and to recognize and manage the emotional and socioeconomic problems that affect recovery.

Physical therapists evaluate the condition of the patient, plan and execute treatment programs developed to meet the patient's treatment goals, and periodically reassess those treatment goals. In addition, they develop injury-prevention and health-promotion activities and are trained to integrate their treatment plans into the total care plan for the patient. Additional responsibilities may include health-care planning and community service.

Northeastern's physical therapy program is one of the few programs that accepts students directly. Students are physical therapy majors on their first day of classes, and there are no additional admission steps at any point. To continue in the program, students must maintain acceptable standards of scholarship and academic performance (as outlined in the student handbook) and must develop appropriate motor skills, professional behavior, and emotional maturity.

The department's five-year Bachelor of Science program stresses clinical problem solving. In the classroom students develop problem-solving skills, manual dexterity, and proficiency in technique and equipment. Cooperative education experiences give students a chance to apply knowledge gained in the classroom to clinical practice and to become members of the health-care community early in their studies.

In addition to cooperative education, the program includes periods of clinical experience, called affiliations, during which the student performs all duties of the physical therapist under the supervision of a licensed physical therapist.

Cooperative education placements and affiliations are available in a wide range of specialties and are located at sites throughout the country.

The curriculum in physical therapy is accredited by the Commission on Accreditation in Physical Therapy Education of the American Physical Therapy Association.

Physical therapists are employed in private practices; general, children's, and university hospitals; rehabilitation centers; schools or centers for disabled children; extended-care facilities; freestanding outpatient clinics; home-health agencies; and community, state, and federal agencies. They may also become involved in teaching and research.

Graduation Requirements

Students admitted to the Department of Physical Therapy must maintain acceptable standards of scholarship and performance in the prescribed program; demonstrate good health, verbal fluency, essential motor skills, professional behavior, and emotional maturity; complete all required courses; and have favorable evaluations from clinical education and co-op experiences. Students must maintain a grade of C (2.0) or better in all professional courses and all basic science prerequisite courses listed in the academic policy statement of the Department of Physical Therapy. Students may not continue in the program upon earning a grade lower than C in three different science and/or professional courses. An earned grade lower than C for the second time in the same science and/or professional course precludes continuation in the program. These requirements include the professional courses Supervised Clinical Education 1 and 2. Students are expected to adhere to all terms of the department's policy statement. For information on departmental academic policies and procedures, contact the Department of Physical Therapy.

Transfer Students

Transfer students are admitted to the freshman and sophomore years of the physical therapy program based upon academic achievement and the availability of space in a particular graduating class. Consideration will be given to those transfer applicants who have achieved a minimum quality-point average of 3.3 on a four-point scale.

Bachelor of Science Curriculum

Quarter 1 CHM 1111, General Chemistry I; MTH 1106, Fundamentals of Mathematics or MTH 1107, Functions and Basic Calculus; PSY 1111, Foundation of Psychology I, PTH 1007, Cooperative Education in Physical Therapy; and electives.

Quarter 2	BIO 1152, Integrated Human Anatomy and Physiology 1; CHM 1112, General Chemistry 2A; COM 1105, Computer Science and its Applications; ENG 1110, Freshman English 1; and electives.
Quarter 3	BIO 1153, Integrated Human Anatomy and Physiology 2; ENG 1111, Freshman English 2; MTH 1150, Probability, Statistics and the Computer; PTH 1114, Introduction to Physical Therapy; and electives.
Quarter 4	BIO 1154, Integrated Human Anatomy and Physiology 3; PHY 1201, Physics 1; PHY 1501, Physics 1 Lab; PTH 1118, Developmental Basis of Human Performance; and electives. (PTH 1114, Introduction to Physical Therapy; for transfers only.)
Quarter 5	PHY 1202, Physics 2; PSY 1112, Foundation of Psychology 2; PTH 1202, Therapeutic Modalities in Physical Therapy Practice; CPS 1612, Exercise Physiology; and two electives.
Quarter 6	PTH 1310, Clinical Gross Anatomy; PTH 1316, Neuromuscular Physiology; PTH 1320, Soft Tissue Mobilization; and PTH 1325, Clinical Medicine 1.
Quarter 7	ENG 1340, Writing Workshop; PTH 1330, Clinical Kinesiology; PTH 1335, Musculoskeletal Evaluation; PTH 1341, Musculoskeletal Therapeutic Exercise; PTH 1345, Orthopedic Clinical Medicine; and PTH 1352, Psychosocial Aspects of Illness.
Quarter 8	PTH 1356, Prosthetics; PTH 1360, Neurological Therapeutic Exercise; PTH 1361, Neurological Assessment and Adult Neurology; PTH 1366, Neuroanatomy; and PTH 1370, Clinical Seminar.
Quarter 9	PTH 1380, Supervised Clinical Education 1; PTH 1386, Pediatric Neurology; PTH 1391, Cardiopulmonary Rehabilitation in Physical Therapy; PTH 1392, Pathophysiology and Clinical Therapeutics; and PTH 1396, Pediatric Evaluation and Treatment.
Quarter 10	PTH 1426, Functional Assessment of Aging; PTH 1453, Advanced Musculoskeletal Assessment and Treatment; PTH 1405, Research for Physical Therapy; PTH 1411, Clinical Integration; and one elective. Alternate: PTH 1415, Supervised Clinical Education 2.
Quarter 11	Alternate not taken in Quarter 10.
Quarter 12	PTH 1420, Physical Therapy in the Health Care System; PTH 1400, Administration; and two electives.

Toxicology

Robert A. Schatz, PhD, *Associate Professor and Director*

Toxicology examines the adverse effects of chemicals on biologic systems, the conditions under which those effects occur, and the relevant socioeconomic conditions and legal ramifications. The program offers a five-year Bachelor of Science degree that prepares students for work in a variety of specialties.

Forensic toxicology is a hybrid of analytical chemistry and fundamental toxicological principles that focuses on the medical and legal aspects of the harmful effects of chemicals. Biomedical toxicologists are concerned with intoxication by drugs and other chemicals. They are also involved in demonstrating the safety or danger of a drug prior to its release on the market.

Industrial or environmental toxicologists specialize in recognizing, identifying, and quantitating the relative hazards from occupational or public exposure to toxicants. Toxicologists who practice this specialty play a vital role in ensuring the safety of those in the work force or the general public who come into contact with industrial and commercial products.

Numerous federal and local laws aimed at protecting the environment, safeguarding employees in their workplaces, and protecting consumers against hazardous household products have created a critical demand for toxicologists. Job opportunities exist in government, industry, and environmental firms. Many graduates pursue advanced studies.

Quarter 1	BIO 1106, General Biology 1; ENG 1110, English 1; MTH 1107, Functions and Basic Calculus; TOX 1100, Toxicology Orientation; and one arts and sciences elective.
Quarter 2	CHM 1111, General Chemistry 1; ENG 1111, Freshman English 2; PHY 1201, Physics 1; and one arts and sciences elective.

Bachelor of Science Curriculum

Quarter 3	BIO 1107, Animal Biology 2; CHM 1122, Chemistry 2B; MTH 1108, Calculus; and one arts and sciences elective.
Quarter 4	CHM 1264, Organic Chemistry 1; PAH 1202, Anatomy and Physiology 1; PHY 1203, Physics 3; and TOX 1101, Current Topics in Toxicology.
Quarter 5	CHM 1265, Organic Chemistry 2; PAH 1204, Anatomy and Physiology 2; PSY 1211, Statistics in Behavioral Science; and one arts and sciences elective.
Quarter 6	PAH 1280, Biochemistry; PMC 1322, Pharmaceutical Biotechnology; PMC 1419, Medicinal Chemistry/Pharmacology 1; and one arts and sciences elective.
Quarter 7	ENG 1340, Writing Workshop; PCL 1420, Pharmacology/Medicinal Chemistry 2; PCL 1451, Pharmacology Lab; TOX 3121, Environmental Toxicology; and one arts and sciences elective.
Quarter 8	PCL 1422, Pharmacology/Medicinal Chemistry 3; MHP 3200, Risk Assessment; TOX 1301, Fundamental Principles of Systemic Toxicology <i>or</i> one professional elective.
Quarter 9	BIO 1120, Basic Microbiology; BIO 1261, Cell Physiology and Biochemistry; TOX 1300, Clinical Toxicology; TOX 1813, Toxicology Research <i>or</i> one professional elective.
Quarter 10	CHM 1432, Instrumental Analysis <i>or</i> CHM 1461, Identification of Organic Compounds; TOX 1322, Biochemical Toxicology Laboratory; TOX 1811, Toxicology Research; and one arts and sciences elective.
Quarter 11	MLS 4341, Epidemiology; TOX 1302, Chemical and Analytical Toxicology; TOX 1813, Toxicology Research; and one or two arts and sciences electives.

Post-Baccalaureate Certificate Programs

Cardiovascular Technology

A nine-month program in cardiovascular technology is available for professionals with a baccalaureate or master's degree who are interested in working in a cardiac catheterization laboratory. The curriculum allows students with the science background needed to master professional courses to integrate didactic and clinical practice. Graduates are eligible to take the National Board Examination for Registered Cardiovascular Technologists.

Medical Laboratory Science

The program in medical laboratory science enables students with a baccalaureate degree and sufficient background in the biological and chemical sciences to become eligible for certification in clinical microbiology, chemistry, hematology, immunohematology, or immunology. Depending upon the specialty, students must complete 18 to 23 quarter hours of professional coursework, which must include applied study at an affiliated clinical site. After completing the program, students may be eligible for the national certification examination in a specialty area. Completion requires 12 to 24 months of part-time study depending on prerequisite coursework, specialty chosen, and the timing of a student's entry into the program.

Perfusion Technology

The perfusion technology certificate program is open to professionals with a baccalaureate or master's degree. Candidates must have the science background needed to master professional courses in the curriculum. The curriculum allows students to integrate didactic, laboratory, and clinical practice courses over a twelve-month period. Graduates of the program are eligible to take the National Board Examination for Certified Cardiovascular Perfusionists.

Respiratory Therapy

An accelerated program in respiratory therapy is available for professionals with a baccalaureate or master's degree. The curriculum allows students with the science background needed to master professional courses to integrate didactic, laboratory and clinical practice over a twelve-month period. Graduates of the program are eligible to take the National Board Examination for Registered Respiratory Therapists.

College of Business Administration

David P. Boyd, PhD, *Dean*

Roger M. Atherton, Jr., PhD, *Associate Dean for Faculty*

Jay A. Halfond, PhD, *Associate Dean for Administration*

William I. Kelly, MS, *Director, Graduate School of Professional Accounting*

Coleen C. Pantalone, PhD, *Associate Dean for Undergraduate Programs*

Dennis Ramsier, MBA, *Assistant Dean, Undergraduate Programs*

Jonathan B. Welch, PhD, *Associate Dean for Graduate Programs*

Accounting Group

Professors

Joseph R. Curran, PhD

Paul A. Janell, PhD,

Joseph M. Golemme

Professor of Accounting

Sharon M. McKinnon, PhD

Russell W. Olive, DBA

Associate Professors

Julie Hertenstein, DBA

H. David Sherman, DBA

Assistant Professors

Brenda H. Anderson, PhD

Janice D. DiPietro, DBA

Amitabh Dugar, PhD

James J. Maroney, PhD

Timothy J. Rupert, MS

Lecturers

Michael D. Cottrill, MAC

Lynn W. Marples, MBA

Peggy L. O'Kelly, MBA

Jonathan D. Pond, PhD

Finance and Insurance Group

Professors

Wesley W. Marple, Jr., DBA

Joseph W. Meador, PhD

Harlan D. Platt, PhD

Jonathan B. Welch, PhD

Associate Professors

Paul J. Bolster, PhD

Jeffery A. Born, PhD

Donald G. Margotta, PhD

Coleen C. Pantalone, PhD

Assistant Professors

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Jay N. Ball, PhD

Hugo J. Faria, PhD

Vahan Janjigian, PhD

Mark Kazarosian, PhD

Carolyn D. Schellhorn, PhD

Emery A. Trahan, PhD

Lecturer

Peggy L. Fletcher, MBA

General Management Group

Professors

Roger M. Atherton, PhD

Charles D. Baker, MBA

Philip T. Crotty, EdD

Robert C. Lieb, DBA

Daniel J. McCarthy, DBA

Ravi Sarathy, PhD

Heidi Vernon-Wortzel, PhD

Associate Professors

William F. Crittenden, PhD

Raymond M. Kinnunen, DBA

Marc H. Meyer, PhD

James F. Molloy, Jr., PhD

Carl W. Nelson, PhD

Ravi Ramamurti, DBA

Assistant Professor

Alvin G. Wint, DBA

Lecturers

Stanley R. Berkowitz, JD

Joseph W. Chevarley, DBA

James S. Cook, AB

Mary F. Costello, JD

Robert L. Goldberg, MBA

Richard P. Olsen, DBA

Robert W. Stuart, PhD

Ronald S. Thomas, PhD

Seymour Tilles, DBA

Human Resources Group

Professors

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Richard B. Higgins, PhD

Ralph Katz, PhD

Associate Professors

Rae Andre, PhD

Brendan D. Bannister, DBA

Thomas M. Begley, PhD

Cynthia Lee, PhD

Edward F. McDonough III, PhD

Bert A. Spector, PhD

Francis C. Spital, PhD

Edward G. Wertheim, PhD

Assistant Professor

Sheila M. Puffer, PhD

Management Science Group**Professors**

Sangit Chatterjee, PhD
 Michael J. Maggard, PhD
 Robert A. Millen, PhD
 Erl Sorensen, PhD

Associate Professors

Ramaiya Balachandra, PhD
 Kathleen Foley Curley, PhD
 Victor B. Godin, DBA
 Robert A. Parsons, MA
 Marjorie Platt, PhD
 Marius M. Solomon, PhD
 Eileen M. Trauth, PhD
 Mustafa R. Yilmaz, PhD

Assistant Professors

Maria-Cecilia A. Carrera, PhD
 J. Stephanie Collins, PhD
 Michael H. Zack, DBA

Lecturer

Richard J. Briotta, MBA

Marketing Group**Professors**

Robert J. Minichiello, DBA
 Samuel Rabino, PhD
 Frederick Wiseman, PhD

Associate Professors

Dan T. Dunn, Jr., DBA
 Robert F. Young, DBA

Assistant Professors

Gloria Barczak, PhD
 John Friar, PhD
 Lynn J. Jaffe, DBA
 Harlan E. Spotts, PhD

Lecturer

Bruce H. Clark, MBA

Programs in the College of Business Administration are designed for students who are preparing to take on managerial responsibility. These programs help students develop the ability to recognize and solve business and organizational problems and understand the role of business in the community, the nation, and the world.

The college's goal is to help students develop ideals that are ethically sound and socially desirable; cultivate an awareness of the social, political, and economic developments to which businesses must adapt; develop sound judgment and effective communication skills; and develop their individual interests and talents.

Modern business faces many challenges from unprecedented political change and the effects of foreign policy, high technology, affirmative-action regulations, and new economic policies. These challenges have increased the demand for highly trained individuals equipped to analyze and address our economy's complex social and legal problems.

The college offers a Bachelor of Science degree in international business and in business administration with concentrations in accounting, entrepreneurship and small business management, finance and insurance, human resources management, international business, logistics and transportation, management, management information systems, and marketing. The business curriculum is enhanced by courses in the sciences, humanities, and social sciences. In addition to their academic courses, all students are required to complete a five-year or a four-year cooperative education plan.

Co-op provides a learning experience beyond the classroom. Textbook examples come to life in real-world business settings. Classroom theories are applied to actual business problems. In turn, these experiences serve to stimulate inquiry and discussion back in the classroom. This interaction between college studies and cooperative education sets the stage for a lifetime of learning.

The undergraduate program of the College of Business Administration meets the standards of the American Assembly of Collegiate Schools of Business for faculty and student quality, curriculum design, and overall University support.

Business majors go on to graduate work in business as well as public health-care and education administration. Many careers in law also require an understanding of business concepts. Although the Association of American Law Schools does not recommend particular courses for prelegal students, it does advise undergraduates to develop critical understanding of the institutions and values with which the law deals.

Class Entrance Requirements

Listed below are the quality-point averages required for students to advance to the next class year and to graduate.

	Overall QPA	Freshman Core Courses QPA*	Business Courses QPA
Sophomore	1.4	1.8	1.8
Middler	1.9		1.9
Junior	2.0		2.0
Senior	2.0		2.0
To graduate	2.0		2.0

*Freshman Core Courses refers to Freshman English I and II, Macro and Micro Economics, Calculus for Business, and Introduction to Business.

Graduation Requirements

Bachelor of Science degree candidates must complete all prescribed work of the curriculum in which they seek to qualify, currently 176 quarter hours. The degree not only represents the formal completion of selected courses, but also indicates professional study in the major or concentration. A quality-point average of C (2.0) and a C average in all business courses are required for graduation.

Minor in Business Administration

Students must be enrolled in a full program of studies in the College of Business Administration during the final three quarters preceding graduation.

All courses in the College of Business Administration are available to all nonbusiness students at Northeastern University if they meet the class standing and course requirements. Nonbusiness students may find the minor attractive if they are considering a career in business or pursuing an MBA. The minor consists of eight courses. Students who wish to enter the program should speak with an adviser in the Undergraduate Business Programs Office upon successful completion of at least the macro economics and college algebra courses. Students who complete all eight courses successfully and have earned at least a C (2.0) average in them will be awarded a minor in Business Administration at graduation.

Minor Curriculum

Background courses: MTH 1101, Applications of Algebra *or* MTH 1106, Functions and Algebra *or* MTH 1113, College Math for Business and Economics *or* better; ECN 1115, Principles of Macroeconomics.

Required courses: MGT 1115, Introduction to Business; ACC 1111, Accounting Principles 1; HRM 1432, Organizational Behavior *or* HRM 1431, Complex Organizations; FIN 1438, Principles of Finance 1; MKT 1435, Introduction to Marketing. Plus one of the following: MGT 1450, Business Policy; ENT 1330, Entrepreneurship; INB 1338, Introduction to International Business; MSC 1441, Operations Management.

Certificate programs. The College offers a number of certificate programs which recognize a business or nonbusiness student's acquired expertise in specified areas of specialization.

Five-Year Bachelor of Science Curriculum for First Three Quarters

The courses taken in the first three quarters of the five-year program are the same for all concentrations.

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| Quarter 1 | ECN 1115, Principles of Macroeconomics; ENG 1110, Freshman English 1; and two arts and sciences electives. |
| Quarter 2 | MGT 1115, Introduction to Business; MTH 1114, Calculus for Business; and two arts and sciences electives. |
| Quarter 3 | ECN 1116, Principles of Microeconomics; ENG 1111, Freshman English 2; and two arts and sciences electives. |

Four-Year Bachelor of Science Curriculum for First Five Quarters

The courses taken in the first five quarters of the four-year program are the same for all concentrations.

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|-----------|--|
| Quarter 1 | MGT 1115, Introduction to Business; non-business elective <i>or</i> MTH 1113, Mathematics for Business and Economics; ENG 1110, Freshman English 1, and a non-business elective. |
| Quarter 2 | ECN 1115, Principles of Macroeconomics; MTH 1114, Calculus for Business; and two non-business electives. |
| Quarter 3 | ECN 1116, Principles of Microeconomics; ENG 1111, Freshman English 2; and three non-business electives. |
| Quarter 4 | ACC 1111, Accounting Principles 1; MSC 1200, Business Statistics 1; MSC 1226, Computer Based Information Systems; and a non-business elective. |
| Quarter 5 | ACC 1112, Accounting Principles 2; MSC 1201, Business Statistics 2; ENG 1381, Writing for the Professions: Business Administration; and two non-business electives. |

Accounting

A concentration in accounting prepares the graduate for entry into one of the fastest growing and most critical areas of management. Accounting is an exacting field that requires accuracy, the ability to reason, and the skills to interpret business data and to deal with people. Accountants hold sensitive management positions in private firms in business or industry, public accounting firms, and governmental agencies.

To prepare for an accounting career, students take courses in financial and managerial reporting, systems design and installation, taxation, and auditing. Elective courses are available for more specialized study in cost accounting, accounting theory, planning and control, auditing, and taxes.

Students may also count up to eighteen months of cooperative education experience in auditing toward the three years required to become a Certified Public Accountant.

Five-Year Bachelor of Science Curriculum

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| Quarters 1-3 | See above. |
| Quarter 4 | ACC 1111, Accounting Principles 1; MSC 1200, Business Statistics 1; MSC 1226, Computer-Based Information Systems; and one nonbusiness elective. |

Four-Year Bachelor of Science Curriculum

Quarter 5	ACC 1112, Accounting Principles 2; MSC 1201, Business Statistics 2; a nonbusiness elective; and an open elective.
Quarter 6	ACC 1331, Intermediate Accounting 1; FIN 1438, Principles of Finance 1; and HRM 1433, Organizational Behavior and Design.
Quarter 7	ACC 1332, Intermediate Accounting 2; ACC 1339, Cost Accounting; FIN 1439, Principles of Finance 2; and MKT 1435, Introduction to Marketing.
Quarter 8	ACC 1343, Intermediate Accounting 3; ACC 1345, Accounting Systems; MSC 1441, Operations Management; and one nonbusiness elective.
Quarter 9	ACC 1347, Auditing; MSC 1433, Quantitative Models in Business; MGT 1446, Managing Social Issues; and upper division writing requirement.
Quarter 10	ACC 1351, Federal Income Tax 1; MGT 1450, Business Policy; and two open electives.
Quarter 11	Three open electives and a nonbusiness elective.
Quarters 1–5	See page 76.
Quarter 6	ACC 1331, Intermediate Accounting 1; ACC 1339, Cost Accounting; FIN 1438, Principles of Finance 1; MSC 1441, Operations Management.
Quarter 7	ACC 1332, Intermediate Accounting 2; MKT 1435, Introduction to Marketing; FIN 1439, Principles of Finance 2; HRM 1433, Organizational Behavior and Design.
Quarter 8	ACC 1343, Intermediate Accounting 3; MGT 1446, Managing Social Issues; MSC 1433, Quantitative Models in Business; and an open elective.
Quarter 9	ACC 1351, Federal Income Tax 1; MGT 1450, Business Policy; ACC 1345, Accounting Systems; and two open electives.
Quarter 10	ACC 1347, Auditing; and three open electives.

Entrepreneurship and Small Business Management

The concentration in entrepreneurship and small business management helps students develop the skills needed to work effectively within a small business or to start or acquire and manage their own.

Students learn to assess their personal aptitude and potential for small business; find and evaluate business opportunities; secure essential funding; and organize and manage such functional business areas as manufacturing, marketing, accounting, and finance. They will learn these important skills by taking courses in entrepreneurship, starting and managing new businesses, small business finance, and planning and growing new ventures.

This concentration also helps students prepare for careers in sales management, banking, public accounting, and other areas relevant to the small business environment.

During their senior year, students participate in the Small Business Institute Field Project. Offered in conjunction with the United States Small Business Administration, this unique course offers students the chance to work, under faculty guidance, as consultants to small business owners; students analyze company needs and help develop practical solutions to actual management problems.

Five-Year Bachelor of Science Curriculum

Quarters 1–3	See page 76.
Quarter 4	ACC 1111, Accounting Principles 1; MSC 1200, Business Statistics I; MSC 1226, Computer-Based Information Systems; and one nonbusiness elective.
Quarter 5	ACC 1112, Accounting Principles 2; MSC 1201, Business Statistics 2; and two nonbusiness electives.
Quarter 6	ENT 1330, Management of Smaller Enterprises; FIN 1438, Principles of Finance 1; MKT 1435, Introduction to Marketing; and an open elective.
Quarter 7	FIN 1439, Principles of Finance 2; HRM 1433, Organizational Behavior and Design; and MSC 1433, Quantitative Models in Business.
Quarter 8	ENT 1344, Opportunity Analysis and Venture Capital; a nonbusiness elective; an open elective; and upper division writing requirement.
Quarter 9	FIN 1770, Small Business Finance; MGT 1446, Managing Social Issues; MSC 1441, Operations Management; and an open elective.
Quarter 10	MGT 1450, Business Policy; ENT 1352, New Venture Creation; and two open electives.
Quarter 11	ENT 1358, Small Business Institute Field Project; and two open electives.
Quarters 1–5	See page 76.
Quarter 6	MKT 1435, Introduction to Marketing; FIN 1438, Principles of Finance 1; MSC 1441, Operations Management; and one open elective.

Four-Year Bachelor of Science Curriculum

Quarter 7	ENT 1330, Small Business Management; FIN 1439, Principles of Finance 2; HRM 1433, Organizational Behavior and Design; and one open elective.
Quarter 8	FIN 1770, Small Business Finance; MGT 1446, Managing Social Issues; ENT 1344, Opportunity Analysis and Venture Capital; MSC 1433, Quantitative Models in Business.
Quarter 9	MGT 1450, Business Policy; and four open electives.
Quarter 10	ENT 1352, New Venture Creation; ENT 1358, Small Business Institute Project; and an open elective.

Finance and Insurance

The role of people trained in finance and insurance is expanding rapidly within the business world. Changes on the financial scene—rising securities prices, fluctuating inflation and interest rates, and scarcity of capital—have created an awareness that financial knowledge is essential to the effective management of business firms.

Finance is the management and investment of money and other assets for business, financial institutions, nonprofit organizations, governments, and individuals.

The program draws on accounting principles, economic theory, and quantitative methods to direct the way money is managed, acquired, and distributed. Students learn how economic systems operate and how money markets work within economic systems. They also learn to analyze economic trends and indications and to examine the movement and distribution of money.

Students may specialize in one or more of the following areas: management finance, investment management and analysis, management of financial institutions, insurance and risk management, real estate, and financial planning. The program prepares students for careers in financial management, security analysis, investment management, security or insurance brokerage, underwriting, credit management, and risk management with corporations, commerce banks, insurance companies, and other financial institutions.

Five-Year Bachelor of Science Curriculum

Quarters 1–3	See page 76.
Quarter 4	ACC 1111, Accounting Principles 1; MSC 1200, Business Statistics 1; and two nonbusiness electives.
Quarter 5	ACC 1112, Accounting Principles 2; MSC 1201, Business Statistics 2; MSC 1226, Computer-Based Information Systems; and a nonbusiness elective.
Quarter 6	FIN 1438, Principles of Finance 1; FIN 1333, Financial Institutions and Markets; MKT 1435, Introduction to Marketing; and a nonbusiness elective.
Quarter 7	FIN 1439, Principles of Finance 2; HRM 1433, Organizational Behavior and Design; and MSC 1433, Quantitative Models in Business.
Quarter 8	FIN 1335, Managerial Finance; FIN 1346, Investment Management; upper-division writing requirement; and an open elective.
Quarter 9	MSC 1441, Operations Management; MGT 1446, Managing Social Issues; finance elective; and an open elective.
Quarter 10	MGT 1450, Business Policy; finance elective; and two open electives.
Quarter 11	Finance elective and three open electives.

Four-Year Bachelor of Science Curriculum

Quarters 1–5	See page 76.
Quarter 6	FIN 1438, Principles of Finance 1; FIN 1333, Financial Institutions and Markets; MSC 1441, Operations Management; and one open elective.
Quarter 7	FIN 1439, Principles of Finance 2, MKT 1435, Introduction to Marketing; HRM 1433, Organizational Behavior and Design; and one open elective.
Quarter 8	FIN 1335, Managerial Finance; MGT 1446, Managing Social Issues; MSC 1433, Quantitative Models in Business; and one open elective.
Quarter 9	FIN 1346, Investment Management; MGT 1450, Business Policy; one finance elective; and two open electives.
Quarter 10	Two finance electives and two open electives.

Human Resources Management

Human resources management (HRM) focuses on the effective utilization of people at work. Traditionally, the major areas of HRM include employee relations, recruitment, selection, compensation, and training. Although expertise in these areas is necessary, major changes in the field have led to a more strategic role for the human resources professional. Today, human resource managers must be skilled in job and organizational design, innovative career planning, and leading effective internal change.

The successful management of human resources calls for a partnership among human resources professionals, labor relations negotiators, wage and salary analysts, and operating line managers in a company's functional areas (marketing, finance, and production). With the challenges brought about by an increasingly diverse work force and rapid international expansion, however, the importance of HRM has increased dramatically in recent years. HRM professionals now oversee organizational compliance with equal-opportunity laws, institute affirmative action procedures, and design or manage participative work systems.

Coursework focuses on a wide range of issues that affect human resources management: labor issues, negotiating strategies, psychological principles underlying organizational and human behavior, job enrichment, and organizational development activities.

Five-Year Bachelor of Science Curriculum

Quarters 1–3	See page 76.
Quarter 4	ACC 1111, Accounting Principles 1; MSC 1200, Business Statistics 1; MSC 1226, Computer-Based Information Systems; and one nonbusiness elective.
Quarter 5	ACC 1112, Accounting Principles 2; MSC 1201, Business Statistics 2; and two nonbusiness electives.
Quarter 6	FIN 1438, Principles of Finance 1; HRM 1433, Organizational Behavior and Design; and MSC 1433, Quantitative Models in Business.
Quarter 7	FIN 1439, Principles of Finance 2; HRM 1332, Introduction to Human Resource Management; MKT 1435, Introduction to Marketing; and an open elective.
Quarter 8	HRM 1348, Reward Systems; HRM 1349, Assessment of Prospective Employees; MSC 1441, Operations Management; and an open elective.
Quarter 9	MGT 1446, Managing Social Issues; human resources management elective; upper division writing requirement; and an open elective.
Quarter 10	HRM 1345, Contemporary Labor Issues; MGT 1450, Business Policy; human resources management elective; and an open elective.
Quarter 11	Nonbusiness elective and three open electives.

Four-Year Bachelor of Science Curriculum

Quarters 1–5	See page 76.
Quarter 6	FIN 1438, Principles of Finance 1; MSC 1441, Operations Management; HRM 1433, Organizational Behavior and Design.
Quarter 7	HRM 1332, Introduction to Human Resource Management; FIN 1439, Principles of Finance 2; MKT 1435, Introduction to Marketing; and two open electives.
Quarter 8	HRM 1345, Contemporary Labor Issues; MSC 1433, Quantitative Models in Business; MGT 1446, Managing Social Issues; and one HRM elective.
Quarter 9	HRM 1348, Reward Systems; HRM 1349, Selection and Assessment; MGT 1450, Business Policy; and two open electives.
Quarter 10	Human resources management elective and three open electives.

International Business Administration

The recent growth of multinational firms, international trade, and regional international trading blocs has created a shortage of skilled managers who are equipped to analyze the complexities of international business.

The international business administration concentration fosters an understanding of problems involved in operating businesses across national boundaries and analyzes the operations of businesses in multinational environments.

It is increasingly common for multinational firms to require that candidates for top management positions have prior experience in international operations. In addition, large banks and insurance companies, governments, trade associations, and transnational bodies also have a growing need for managers who understand international business issues.

The concentration in international business administration includes broad-based courses dealing with the international environment as well as functional business courses with an international focus. Some of these courses are offered by the College of Business Administration; those in the

humanities and social sciences are offered by the College of Arts and Sciences. All courses in the international business administration concentration are available to students in other concentrations during their middler, junior, and senior years.

Since most careers in international business begin in a functional area that has an international component, students are encouraged to complete a dual concentration. For example, students may combine a concentration in international business administration with one in finance, marketing, accounting, or human resources management. Students are also encouraged to develop competency in a foreign language, a skill viewed as a major asset by many prospective employers.

The College of Business Administration has extensive international contacts that enable many students to participate in international cooperative work experiences or internships.

Five-Year Bachelor of Science Curriculum

Quarters 1–3	See page 76.
Quarter 4	ACC 1111, Accounting Principles 1; MSC 1200, Business Statistics 1; and two nonbusiness electives.
Quarter 5	ACC 1112, Accounting Principles 2; MSC 1201, Business Statistics 2; MSC 1226, Computer-Based Information Systems; and one open elective.
Quarter 6	FIN 1438, Principles of Finance 1; HRM 1433, Organizational Behavior and Design; and INB 1338, Introduction to International Business.
Quarter 7	FIN 1439, Principles of Finance 2; MKT 1435, Introduction to Marketing; and MSC 1433, Quantitative Models in Business; and an open elective.
Quarter 8	MSC 1441, Operations Management; a business elective; an international non-business elective; and an open elective.
Quarter 9	FIN 1759, International Financial Markets; MGT 1446, Managing Social Issues; upper division writing requirement; and an international business elective.
Quarter 10	MGT 1450, Business Policy; an international nonbusiness elective; and two open electives.
Quarter 11	INB 1352, Seminar in International Business; an international business elective; and two open electives.

Four-Year Bachelor of Science Curriculum

Quarters 1–5	See page 76.
Quarter 6	INB 1338, Introduction to International Business; FIN 1438, Principles of Finance 1; MKT 1435, Introduction to Marketing; MSC 1441, Operations Management.
Quarter 7	FIN 1439, Principles of Finance 2; HRM 1433, Organizational Behavior and Design; and two open electives.
Quarter 8	MGT 1446, Managing Social Issues; MSC 1433, Quantitative Models in Business; one IB elective; and one open elective.
Quarter 9	FIN 1759, International Financial Markets; MGT 1450, Business Policy; one business elective; and two open electives.
Quarter 10	INB 1352, Seminar in International Business; one IB elective; and two open electives.

Logistics and Transportation

From the Fortune 500 manufacturer to the small retail firm that produces, sells, or distributes products, all companies have a logistics function that must be effectively managed if they are to be competitive. A logistics manager is typically involved in making critical decisions about such matters as the modes of transportation used to move the company's materials and products, inventory policies, warehousing needs, and the location of facilities.

As American corporations become increasingly involved in global markets, logistics managers play a major role not only in assessing the feasibility of international activity, but also in developing distribution networks to support that involvement. Logistics management is one of the most rapidly expanding areas of business.

The academic work in the program flows from introductory courses in transportation through advanced study in physical distribution management. Electives then provide in-depth examinations of how goods and services reach their destinations. The program culminates in a senior seminar. Courses address not only the viewpoints of corporate shippers and carriers, but also those of public officials and consumer advocates.

Logistics and transportation managers frequently interact with managers from other functional areas; it is useful for a student therefore to complete a dual concentration in finance, marketing, or another functional area.

In addition to corporations, companies (carriers) that sell transportation services offer rewarding career opportunities. The nation's carriers, including the airlines, railroads, trucking companies, and urban transit systems, increasingly rely on individuals who are skilled in logistics and transportation management.

Students interested in public policy and administration may pursue careers with the federal, state, and local government agencies involved in the financing and the economic and safety regulation of the transportation infrastructure.

Five-Year Bachelor of Science Curriculum

Quarters 1–3	See page 76.
Quarter 4	ACC 1111, Accounting Principles 1; MSC 1200, Business Statistics 1; and two nonbusiness electives.
Quarter 5	ACC 1112, Accounting Principles 2; MSC 1201, Business Statistics 2; MSC 1226, Computer-Based Information Systems; and a nonbusiness elective.
Quarter 6	FIN 1438, Principles of Finance 1; HRM 1433, Organizational Behavior and Design; and TRN 1333, The Domestic Transportation System.
Quarter 7	FIN 1439, Principles of Finance 2; a transportation elective; MKT 1435, Introduction to Marketing; and MSC 1433, Quantitative Models in Business.
Quarter 8	MSC 1441, Operations Management; a transportation elective; a nonbusiness elective; and an open elective.
Quarter 9	MGT 1446, Managing Social Issues; TRN 1344, Corporate Transportation/Logistics; an open elective; and an upper division writing requirement.
Quarter 10	MGT 1450, Business Policy; a transportation elective; and two open electives.
Quarter 11	TRN 1353, Seminar in Transportation; and three open electives.

Four-Year Bachelor of Science Curriculum

Quarters 1–5	See page 76.
Quarter 6	TRN 1333, Domestic Transportation System; FIN 1438, Principles of Finance 1; MKT 1435, Introduction to Marketing; MSC 1441, Operations Management.
Quarter 7	FIN 1439, Principles of Finance 1; HRM 1433, Organizational Behavior and Design; one TRN elective; and one open elective.
Quarter 8	MGT 1446, Managing Social Issues; MSC 1433, Quantitative Models in Business; and two open electives.
Quarter 9	MGT 1450, Business Policy; TRN 1344, Business/Logistics; one TRN elective; and two open electives.
Quarter 10	TRN 1353, Seminar in Transportation and Logistics; one TRN elective; and two open electives.

Management

The concentration in management is designed for the student with a strong interest in motivating people to provide goods and services creatively and productively.

The program helps students understand the various aspects of administrative practice and develop judgment and skills in organizational problem analysis and decision making. It focuses on three functional areas—marketing, finance, and operations—and explores the interrelation of these areas and the ways they can be used as management tools. To these are added the perspectives of law, accounting, and management information systems. Finally, the concentration includes several courses on business policy that are intended to develop skills in both the integrative and strategic roles of management.

Through extensive use of case studies, management simulations, and group research projects, students develop leadership skills. Faculty pay significant attention to “people problems” in order to stress the importance of developing an effective work force.

Five-Year Bachelor of Science Curriculum

Quarters 1–3	See page 76.
Quarter 4	ACC 1111, Accounting Principles 1; MSC 1200, Business Statistics 1; and two nonbusiness electives.
Quarter 5	ACC 1112, Accounting Principles 2; MSC 1201, Business Statistics 2; MSC 1226, Computer-Based Information Services; and a nonbusiness elective.
Quarter 6	FIN 1438, Principles of Finance 1; HRM 1433, Organizational Behavior and Design; and MSC 1433, Quantitative Models in Business.

Four-Year Bachelor of Science Curriculum

Quarter 7	ACC 1330, Cost Accounting; FIN 1439, Principles of Finance 2; MKT 1331, Marketing Management; and MKT 1435, Introduction to Marketing.
Quarter 8	MGT 1345, Legal Aspects of Business; MSC 1441, Operations Management; a business elective; and an open elective.
Quarter 9	MGT 1446, Managing Social Issues; a business elective; an open elective; and upper division writing requirement.
Quarter 10	MGT 1450, Business Policy; a nonbusiness elective; and two open electives.
Quarter 11	Business elective and three open electives.
Quarters 1–5	See page 76.
Quarter 6	FIN 1438, Principles of Finance 1; MKT 1435, Introduction to Marketing; MSC 1441, Operations Management; and one business elective.
Quarter 7	MKT 1331, Marketing Management; FIN 1439, Principles of Finance 2; HRM 1433, Organizational Behavior and Design; and one open elective.
Quarter 8	MGT 1446, Managing Social Issues; MSC 1433, Quantitative Models in Business; and two open electives.
Quarter 9	MSC 1341, Information Resource Management; MGT 1450, Business Policy; MGT 1345, Legal Aspects of Business; and two open electives.
Quarter 10	HRM 1350, Strategic Management of Human Resources; MGT 1350, Advanced Strategic Management; and two open electives.

Management Information Systems

The concentration in management information systems (MIS) is designed to teach tomorrow's managers how to derive the maximum benefit from state-of-the-art information technology.

The program provides a background in two distinct tracks. The first builds on the historical development of large and powerful computers that carry out organization-wide tasks, such as database management. The second track, often referred to as "end-user computing," deals with the direct linkage of decision makers and user-friendly computer facilities.

Through an in-depth examination of case studies, the capstone senior year course, Business Systems Integration, illustrates how management information technology is used to identify and solve an organization's information-related problems.

MIS managers interact frequently with other managers throughout an organization; therefore students are encouraged to complete a dual concentration in one of the functional areas of management.

Five-Year Bachelor of Science Curriculum

Quarters 1–3	See page 76.
Quarter 4	ACC 1111, Accounting Principles 1; MSC 1200, Business Statistics 1; and two nonbusiness electives.
Quarter 5	ACC 1112, Accounting Principles 2; MSC 1201, Business Statistics 2; MSC 1226, Computer-Based Information Systems; and one open elective.
Quarter 6	FIN 1438, Principles of Finance 1; HRM 1433, Organizational Behavior and Design; and an open elective.
Quarter 7	FIN 1439, Principles of Finance 2; MKT 1435, Introduction to Marketing; MSC 1335, Telecommunications and Networks; and MSC 1433, Quantitative Models in Business.
Quarter 8	MSC 1441, Operations Management; MSC 1330, Data Management; MSC 1332, Decision Support Systems for Business; and a nonbusiness elective.
Quarter 9	MGT 1446, Managing Social Issues; MSC 1336, Business Programming; upper division writing requirement; and a nonbusiness elective.
Quarter 10	MGT 1450, Business Policy; MSC 1350, Database Management Systems; MSC 1341, Information Resource Management; and one open elective.
Quarter 11	MSC 1342, Business Systems Integration; and three open electives.
Quarters 1–5	See page 76.
Quarter 6	MSC 1335, Telecommunications and Networks; FIN 1438, Principles of Finance 1; MKT 1435, Introduction to Marketing; MSC 1441, Operations Management.

Four-Year Bachelor of Science Curriculum

Quarter 7	MSC 1336, Business Programming; FIN 1439, Principles of Finance 2; HRM 1433, Organizational Behavior and Design; and one open elective.
Quarter 8	MSC 1341, Information Resource Management; MSC 1433, Quantitative Models in Business; MGT 1446, Managing Social Issues; and one open elective.
Quarter 9	MSC 1330, Data Management; MGT 1450, Business Policy; MSC 1332, Business Support Systems for Business; and two open electives.
Quarter 10	MSC 1342, Business Systems Integration; and three open electives.

Marketing

A business not only designs and manufactures products, but also markets and sells them to manufacturers, wholesalers, retailers, and consumers. All the activities that direct the flow of goods and services from producer to consumer are classified as marketing concerns. Once an organization determines a customer's needs and wants, its first objective is to produce goods or services to satisfy that particular consumer. Essential in all types of businesses are product design, research, pricing, packaging, transportation, advertising, selling, and servicing.

The concentration in marketing is designed to familiarize students with the marketing process and to provide them with the theoretical concepts, skills, and tools necessary to successfully enter and advance in one of the many possible career paths. Students learn to evaluate consumer behavior, employ advertising principles, utilize market research and testing, and develop ways to position products and services in a favorable light. They also explore the changing economic, political, legal, ethical, and cultural contexts in which marketing strategies must be developed.

Students may select courses that lead to one of many career paths within marketing: product or brand management, marketing research, advertising management, retail management, sales management, or international marketing management.

Five-Year Bachelor of Science Curriculum

Quarters 1–3	See page 76.
Quarter 4	ACC 1111, Accounting Principles 1; MSC 1200, Business Statistics 1; MSC 1226, Computer-Based Information Systems; and a nonbusiness elective.
Quarter 5	ACC 1112, Accounting Principles 2; MSC 1201, Business Statistics 2; and two nonbusiness electives.
Quarter 6	FIN 1438, Principles of Finance 1; MKT 1435, Introduction to Marketing; MSC 1433, Quantitative Models in Business; and a nonbusiness elective.
Quarter 7	FIN 1439, Principles of Finance 2; HRM 1433, Organizational Behavior and Design; and MKT 1331, Marketing Management.
Quarter 8	MKT 1341, Marketing Research; a marketing elective; an open elective; and upper division writing requirement.
Quarter 9	MGT 1446, Managing Social Issues; MSC 1441, Operations Management; a marketing elective; and an open elective.
Quarter 10	MKT 1351, Competitive Strategy; MGT 1450, Business Policy; and two open electives.
Quarter 11	Marketing elective and three open electives.

Four-Year Bachelor of Science Curriculum

Quarters 1–5	See page 76.
Quarter 6	MKT 1435, Introduction to Marketing; FIN 1438, Principles of Finance 1; MSC 1441, Operations Management; and one open elective.
Quarter 7	MKT 1331, Marketing Management; FIN 1439, Principles of Finance 2; HRM 1433, Organizational Behavior and Design; and one open elective.
Quarter 8	MKT 1341, Marketing Research; MGT 1446, Managing Social Issues; MSC 1433, Quantitative Models in Business; and one MKT elective.
Quarter 9	MKT 1351, Competitive Strategy; MGT 1450, Business Policy; one MKT elective; and two open electives.
Quarter 10	Marketing elective and three open electives.

International Business

The College of Business Administration is offering a new and innovative degree program, the Bachelor of Science in international business. This program, the first of its kind in the United States, is for the highly motivated student who plans a career in import/export, international finance or manufacturing, or other areas that involve global markets.

Bachelor of Science in International Business

Students are admitted to a French, Spanish, or German track. They develop fluency in their chosen language and study the culture of the country or countries where that language is spoken. In addition, they participate in at least one cooperative education work experience or internship abroad in order to sharpen their language and business skills.

All students in the Bachelor of Science in International Business degree program must take the required courses in the international business administration concentration (see page 79) and are encouraged to develop skills in other business areas such as finance, marketing, management, or human resources.

College of Computer Science

Larry A. Finkelstein, PhD, *Dean*

Agnes H. Chan, PhD, *Acting Director of Graduate Studies*

Richard A. Rasala, PhD, *Director of Undergraduate Studies*

Marie P. Hinds, BS, *Assistant to the Dean*

Professors

Agnes H. Chan, PhD

Gene D. Cooperman, PhD

Harriet J. Fell, PhD

Larry A. Finkelstein, PhD

Karl J. Lieberherr, PhD

Richard A. Rasala, PhD

Betty J. Salzberg, PhD

Raoul N. Smith, PhD

Mitchell Wand, PhD

Patrick S. P. Wang, PhD

Joint Professor

R. Mark Goresky, PhD

Mathematics

Associate Professors

Kenneth P. Baclawski, PhD

John Casey, BA

Robert P. Futrelle, PhD

Carole D. Hafner, PhD

Viera K. Proulx, PhD

Ronald J. Williams, PhD

Bryant W. York, PhD

The invention of powerful computers and the development of complex software programs have fundamentally transformed the way people work and live. Computers are now essential tools in business, industry, science, medicine, and human services. Computers also enhance the efforts of individuals and volunteer groups to meet their goals. In addition, the most sophisticated work in music, film, and video often makes use of computer technology. The College of Computer Science believes that computing is one of the most exciting fields of study and that its applications are limitless.

In the College of Computer Science, students learn about the principles and practices which support the development of high quality software. Computer science as a discipline draws its inspiration from many fields: mathematics, science, engineering, and art. From mathematics, students learn to think logically and to build complex structures from simple and secure components. From the experimental sciences, students learn to estimate the performance of algorithms and then test these estimates in real life. From engineering, students learn to treat program design as a complicated set of tradeoffs between computer resources (execution time, memory needs, peripherals), programmer resources (development time and available software tools), and customer needs (what must be done and how soon). Finally, from art, students learn to value the beauty of the internal program code as well as the quality of the external user interface. The College of Computer Science trains its students to understand and practice the diverse skills that are needed to make a significant contribution to the field of computing.

The undergraduate program in the College of Computer Science treats a variety of subject areas in computing, such as algorithms, data structures, programming language design, compilers, computer architecture, operating systems, database systems, graphics, artificial intelligence, and parallel computing. Qualified students may choose electives from a wide range of more advanced graduate courses. Students may also work individually with professors on research projects or may volunteer with the systems staff in order to enhance their technical experience.

The college offers two undergraduate degrees. The Bachelor of Science emphasizes strong technical competence in computer science, mathematics, physics, and electrical engineering. The Bachelor of Arts combines a computer science major with a broad-based liberal arts education. The Bachelor of Science program is accredited by the Computer Science Accreditation Board.

Normally, the undergraduate degree program is five years, including seven quarters of on-the-job cooperative education in industry. Students may complete the program in four years with a reduced cooperative education component. Because the experience acquired in industry can contribute tremendously to a student's academic and personal development, the college is strongly committed to the principle of cooperative education.

The minimum overall quality-point averages listed are required for students to advance to the next rank and to graduate.

Sophomore	1.7
Middler	1.9
Junior	2.0
Senior	2.0
To graduate	2.0

Class Entrance Requirements

In addition, a minimum quality-point average of 2.0 in all computer science courses (any course number with a COM prefix) is required for graduation. For additional information, consult the *College of Computer Science Undergraduate Student Guidebook*.

Minor in Computer Science

This minor is particularly valuable to non-computer science students seeking positions where a familiarity with computer science concepts and techniques is desirable. Four required level-one courses must be completed, plus three additional computer science courses elected from a number of courses specified by the college. Details may be obtained from the dean's office.

Five-Year Bachelor of Science Curriculum

Quarter 1	COM 1100, Fundamentals of Computer Science; COM 1121, Computer Science Overview 1; ENG 1110, Freshman English 1; MTH 1123, Calculus 1; and one basic social science.
Quarter 2	COM 1101, Algorithms and Data Structures 1; COM 1122, Computer Science Overview 2; MTH 1124, Calculus 2; MTH 1137, Discrete Mathematics 1; and one basic social science.
Quarter 3	COM 1114, C Lab; COM 1201, Algorithms and Data Structures 2; ENG 1111, Freshman English 2; MTH 1125, Calculus 3; and one sub-area or general elective.
Quarter 4	COM 1130, Computer Organization and Programming 1; MTH 1223, Calculus 4; PHY 1221, Physics 1; PHY 1521, Physics 1 Lab; and one sub-area or general elective.
Quarter 5	COM 1110, FORTRAN Lab; COM 1204, Object-Oriented Design; ECE 1178, Digital Electronics for Computer Science; PHY 1222, Physics 2; PHY 1522, Physics 2 Lab; and one sub-area or general elective.
Quarter 6	COM 1330, Operating Systems Concepts; ECE 1229, Digital Systems Lab; ECE 1382, Computer Engineering 2; PHY 1223, Physics 3; and one sub-area or general elective.
Quarter 7	COM 1102, Functional Programming and Applications; COM 1350, Automata and Formal Language; ENG 1125, Technical Writing 1; and MTH 1237, Discrete Mathematics 2.
Quarter 8	COM 1205, Software Design; MTH 1301, Linear Algebra 1; SOC 1485, Computers and Society; and one computer science elective.
Quarter 9	MTH 1387, Probability 1; two computer science electives; and one sub-area or general elective.
Quarter 10	COM 1390, Algorithms; one computer science elective; and two sub-area or general electives.
Quarter 11	COM 1621, Computer Science Seminar; one computer science elective; and three sub-area or general electives.

Four-Year Bachelor of Science Curriculum

Quarter 1	COM 1100, Fundamentals of Computer Science; COM 1121, Computer Science Overview 1; ENG 1110, Freshman English 1; MTH 1123, Calculus 1; and one basic social science.
Quarter 2	COM 1101, Algorithms and Data Structures 1; COM 1122, Computer Science Overview 2; MTH 1124, Calculus 2; MTH 1137, Discrete Mathematics 1; and one basic social science.
Quarter 3	COM 1114, C Lab; COM 1201, Algorithms and Data Structures 2; ENG 1111, Freshman English 2; MTH 1125, Calculus 3; and one sub-area or general elective.
Quarter 4	COM 1130, Computer Organization and Programming 1; MTH 1223, Calculus 4; PHY 1221, Physics 1; PHY 1521, Physics 1 Lab; and one sub-area or general elective.
Quarter 5	COM 1204, Object-Oriented Design; ECE 1178, Digital Electronics for Computer Science; PHY 1222, Physics 2; PHY 1522, Physics 2 Lab; and one sub-area or general elective.
Quarter 6	COM 1110, FORTRAN Lab; COM 1350, Automata and Formal Language; MTH 1387, Probability; and two sub-area or general electives.
Quarter 7	COM 1330, Operating Systems Concepts; ECE 1229, Digital Systems Lab; ECE 1382, Computer Engineering 2; PHY 1223, Physics 3; and one sub-area or general elective.

Five-Year Bachelor of Arts Curriculum (with computer science courses beginning in the first year)	Quarter 8	COM 1102, Functional Programming and Applications; ENG 1125, Technical Writing 1; MTH 1237, Discrete Mathematics 2; and one computer science elective.
	Quarter 9	MTH 1301, Linear Algebra; two computer science electives; and one sub-area or general elective.
	Quarter 10	COM 1205, Software Design and Development; COM 1390, Algorithms; SOC 1485, Computers and Society; and one sub-area or general elective.
	Quarter 11	COM 1621, Senior Seminar; two computer science electives; and two sub-area or general electives.
	Quarter 1	COM 1100, Fundamentals of Computer Science; COM 1121, Computer Science Overview 1; ENG 1110, Freshman English 1; MTH 1123, Calculus 1; and one arts and sciences core course.
	Quarter 2	COM 1101, Algorithms and Data Structures 1; COM 1122, Computer Science Overview 2; MTH 1124, Calculus 2; MTH 1137, Discrete Mathematics 1; and one arts and sciences core course.
	Quarter 3	COM 1114, C Lab; COM 1201, Algorithms and Data Structures 2; ENG 1111, Freshman English 2; MTH 1125, Calculus 3; and one general elective.
	Quarter 4	COM 1130, Computer Organization and Programming 1; one general elective; one science elective; and one arts and sciences core course.
	Quarter 5	COM 1102, Functional Programming and Applications; COM 1350, Automata and Formal Languages; MTH 1237, Discrete Mathematics 2; and one science elective.
	Quarter 6	COM 1390, Analysis of Algorithms; one general elective; one science elective; and one arts and sciences core course.
	Quarter 7	COM 1358, Analysis of Programming Languages; ENG ____, middler year writing requirement; and two arts and sciences core courses.
Five-Year Bachelor of Arts Curriculum (with computer science courses beginning in the second year)	Quarter 8	MTH 1301, Linear Algebra 1; SOC 1485, Computers and Society; one computer science elective; and one arts and sciences core course.
	Quarter 9	One computer science elective; one general elective; and two arts and sciences core courses.
	Quarter 10	One computer science elective; two general electives; and one arts and sciences core course.
	Quarter 11	COM 1621, Computer Science Seminar; one computer science elective; two general electives; and one arts and sciences core course.
	Quarter 1	ENG 1110, Freshman English 1; MTH 1123, Calculus 1; one science elective; and one arts and sciences core course.
	Quarter 2	MTH 1124, Calculus 2; one general elective; one science elective; and one arts and sciences core course.
	Quarter 3	ENG 1111, Freshman English 2; MTH 1125, Calculus 3; one general elective; and one science elective.
	Quarter 4	COM 1100, Fundamentals of Computer Science; COM 1121, Computer Science Overview 1; MTH 1137, Discrete Mathematics 1; and two arts and sciences core courses.
	Quarter 5	COM 1101, Algorithms and Data Structures 1; COM 1122, Computer Science Overview 2; MTH 1237, Discrete Mathematics 2; and two arts and sciences core courses.
	Quarter 6	COM 1201, Algorithms and Data Structures 2; COM 1130, Computer Organization and Programming 1; one general elective; and one arts and sciences core course.
	Quarter 7	COM 1102, Functional Programming and Applications; COM 1114, C Lab; COM 1350, Automata and Formal Language; ENG ____, middler year writing requirement; and one arts and sciences core course.
	Quarter 8	COM 1390, Algorithms; MTH 1301, Linear Algebra; SOC 1485, Computers and Society; and one general elective.
	Quarter 9	COM 1358, Analysis of Programming Languages; one computer science elective; one general elective; and one arts and sciences core course.

**Four-Year Bachelor of Arts
Curriculum**

Quarter 10	Two computer science electives; one general elective; and one arts and sciences core course.
Quarter 11	COM 1621, Computer Science Seminar; one computer science elective; two general electives; and one arts and sciences core course.
Quarter 1	COM 1100, Fundamentals of Computer Science; COM 1121, Computer Science Overview 1; ENG 1110, Freshman English 1; MTH 1123, Calculus 1; and one arts and sciences core course.
Quarter 2	COM 1101, Algorithms and Data Structure 1; COM 1122, Computer Science Overview 2; MTH 1124, Calculus 2; MTH 1137, Discrete Mathematics 1; and one arts and sciences core course.
Quarter 3	COM 1114, C Lab; COM 1201, Algorithms and Data Structure 2; ENG 1111, Freshman English 2; MTH 1125, Calculus 3; and one general elective.
Quarter 4	COM 1130, Computer Organization and Programming 1; one science course; and two arts and sciences core courses.
Quarter 5	COM 1102, Functional Programming and Applications; COM 1350, Automata and Formal Languages; MTH 1237, Discrete Mathematics 2; and one science course.
Quarter 6	COM 1358, Analysis of Programming Languages; one general elective; and two arts and sciences core courses.
Quarter 7	COM 1390, Algorithms; MTH 1301, Linear Algebra; SOC 1485, Computers and Society; and one science course.
Quarter 8	ENG ____, middler year writing requirement; one computer science elective; one general elective; and one arts and sciences core course.
Quarter 9	One computer science elective; one general elective; and two arts and sciences core courses.
Quarter 10	One computer science elective; two general electives; and one arts and sciences core course.
Quarter 11	COM 1621, Computer Science Seminar; one computer science elective; two general electives; and one arts and sciences core course.

College of Criminal Justice

James Alan Fox, PhD, *Dean*

Robert D. Croatti, AB, *Associate Dean for Administrative Operations*

Lester W. McCullough, Jr., BA, *Assistant Dean for Academic Services*

Robert E. Fuller, MA, *Assistant Dean for Student Services*

Professors

Edith E. Flynn, PhD

George L. Kelling, PhD

John H. Laub, PhD

Nicole F. Rafter, PhD

Associate Professors

Frank A. Schubert, JD

Wallace W. Sherwood, LL.M.

Assistant Professors

Lorraine Green, PhD

Susan Guarino-Ghezzi, PhD

Mary Ann Zager, PhD

Visiting Professor

Harvey Burstein, JD

Lecturer

Michael Kass, JD

The College of Criminal Justice was established in 1967 as one of the first professional schools of its type. Since its founding, the college has become a leading force in education, research, and policy-making in both the public and private sectors.

The college has a single undergraduate major, leading to a Bachelor of Science degree in criminal justice, which comprehensively covers the field of criminal justice across both the public and private domains.

Careers in criminal justice involve the concerns and problems of people from all walks of life; therefore coursework integrates social sciences, behavioral sciences, and humanities with professional courses addressing such topics as terrorism, victimology, drug abuse, computer crime, criminal homicide, criminal investigation, prison overcrowding, women in criminal justice, ethics, and legal issues. The liberal content of the curriculum is an indispensable educational requirement for professional development.

The combined five-year academic and cooperative education program allows students to concentrate in one of three areas: policing and security, legal studies, and criminology and corrections.

In the policing and security program students learn firsthand the latest developments in policing in the United States, such as community policing, and gain an understanding of the field of security from a business rather than a law enforcement perspective.

The legal studies concentration teaches students how to analyze the mechanics of law and the legal process and to examine the historical and philosophical foundations of our legal system. Students who concentrate on legal studies are well-prepared for law school.

In the criminology and corrections concentration students investigate the causes of crime and assess various correctional responses to criminal offending. This program is viewed as a stepping stone to advanced graduate study and to employment in the corrections area.

Co-op provides opportunities in the full range of career settings, including parole or probation offices, law firms, police departments, private security agencies, public or private institutions, social and government agencies, prisons, and planning and evaluation units.

The college maintains close ties to criminal justice agencies in the community and hosts the Justice George Lewis Ruffin Society, an organization of minority criminal justice professionals dedicated to expanding minority involvement and leadership in the criminal justice system.

Class Entrance Requirements

Students are required to maintain the following overall quality-point averages to advance to the next class rank and to graduate.

Sophomore	1.4
Middler	1.6
Junior	1.8
Senior	1.9
To graduate	2.0

Graduation Requirements

Degree candidates must complete all prescribed work, a total of 176 quarter hours of credit. Students are also urged to meet the requirements of the Department of Cooperative Education.

Transfer Credit

No student transferring from another college or university is eligible to receive a degree until at least one year of academic work immediately preceding graduation has been completed at Northeastern.

Bachelor of Science Curriculum

Quarter 1	CJ 1101, Administration of Criminal Justice; HST 1101, Western Civilization to 1648; POL 1110, Introduction to Politics; and PSY 1111, Foundations of Psychology 1.
Quarter 2	CJ 1112, Critical Issues in Criminal Justice; COM 1105, Computer Science and Its Applications; ENG 1110, Freshman English 1; and HST 1102, Western Civilization Since 1648.
Quarter 3	CJ 1151, Introduction to Law and Legal Process 1; ENG 1111, Freshman English 2; PSY 1112, Foundation of Psychology 2; and SOC 1100, Introduction to Sociology.
Quarter 4	CJ 1201, Criminology; CJ 1251, Introduction to Criminal Law; POL 1111, Introduction to American Government; and one math/science requirement.
Quarter 5	CJ 1252, Criminal Due Process; POL 1318, State and Local Government; one math/science requirement; and one non-criminal justice elective.
Quarter 6	CJ 1453, Criminal Justice Research Methods; ECN 1115, Principles of Macroeconomics; ENG 1350, Intermediate Writing; and one criminal justice elective.
Quarter 7	CJ 1454, Criminal Justice Statistics; ECN 1116, Principles of Microeconomics; one criminal justice elective; and one non-criminal justice elective.
Quarters 8–11	28 quarter hours of criminal justice electives and 36 quarter hours of non-criminal justice electives.

College of Engineering

Paul H. King, PhD, *Dean*

Yaman Yener, PhD, *Associate Dean and Director, Graduate School of Engineering*

Richard J. Scranton, SM, *Associate Dean for Undergraduate Programs*

Thomas E. Hulbert, MS, PE, *Associate Dean and Director of the School of Engineering Technology*

Cynthia Snow, MA, *Assistant Dean for Administration*

David C. Blackman, MS, *Assistant Dean and Director of Minority Affairs*

Paula G. Leventman, PhD, *Assistant Dean and Director of Women in Engineering*

Candace A. Martel, MEd, *Director of Engineering Student Services*

The College of Engineering prepares students to contribute to the accumulation and application of technical knowledge. The college aims to help students master the fundamental mathematical and scientific principles underlying a particular branch of engineering; develop and demonstrate competence in analysis and design appropriate to an engineering specialization; reason clearly and communicate effectively; and recognize the need to continue professional development.

Through laboratory exercises, senior design projects, professional association activities, and cooperative work assignments, students put theory into practice and clarify their professional goals.

The college offers a Bachelor of Science degree with specializations in chemical, civil, electrical and computer, industrial, and mechanical engineering. Although most students choose to complete the Bachelor of Science degree program in five years including seven quarters of cooperative education experience, four-year options without co-op work or with four quarters of work are also available. Students indicate their preference for the four-year option in the winter quarter of the freshman year.

The college also offers a general engineering program leading to a Bachelor of Science degree without specialization; this option is appropriate for students who want a strong technical base for advanced study in such fields as law, medicine, or business. A program of study for this option is arranged on an individual basis with a faculty adviser. A set of courses related to biomedical engineering is also available.

The college encourages students to study the social sciences and humanities, for they provide an awareness of the social, economic, political, aesthetic, and philosophical influences that shape the world in which graduates will practice their professions.

In addition to a full array of University services, special advising and other support services (including tutoring) are provided. Students may qualify to participate in honors sections of many courses. Active student chapters of many national professional engineering organizations and honor societies are supported by the college as an enriching addition to academic studies and co-op experience.

All Bachelor of Science degree programs with specification offered solely by the College of Engineering are accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (EAC/ABET). Part-time evening programs are also accredited.

The departments of electrical and computer engineering, industrial engineering and information systems, and mechanical engineering offer programs leading to both the bachelor's and master's degrees in five years. Degree candidates must maintain a 3.2 cumulative quality-point average, carry extra courses, and forego one cooperative work quarter in the senior year to complete the course requirements.

Academic standards are published in the *College of Engineering Student Guide*, available at 220 Snell Engineering Center.

The college reserves the right to amend programs, courses, and degree requirements to fulfill its educational responsibility to respond to relevant changes in the field.

Students must complete all of the requirements in the degree program in which they are candidates. Degree requirements are based upon the year of graduation, determined by the date of entry or re-entry into the College of Engineering. Degree requirements and the year of graduation for a degree candidate who fails to make normal academic progress for more than two quarters will be subject to review and possible update.

Students transferring from another college or university are not eligible to receive the Bachelor of Science degree unless they complete at least 48 quarter hours at Northeastern University immediately preceding graduation.

**Bachelor of Science/
Master of Science
Joint Degree Program**

**Class Entrance
Requirements**

Graduation Requirements

**Bachelor of Science
Curriculum for First
Three Quarters**

Students in full-time engineering degree programs take the following courses in the first three quarters.

Quarter 1	ENG 1111, Freshman English 2; GE 1101, Engineering Problem Solving and Computation; MTH 1123, Calculus 1; PHY 1221, Physics 1; and PHY 1521, Physics Lab 1.
Quarter 2	CHM 1131, General Chemistry 1; ENG 1113, Great Themes in Literature; GE 1102, Engineering Problem Solving with Application Software; MTH 1124, Calculus 2; and PHY 1222, Physics 2.
Quarter 3	CHM 1132, General Chemistry 2; GE 1103, Engineering Design and Graphics; MTH 1125, Calculus 3; PHY 1223, Physics 3; and PHY 1523, Physics Lab 2.

Biomedical Engineering

Samuel Fine, SM, MD, *Professor and Director*

Biomedical engineers work on both theoretical and practical problems of biological and medical significance. They may study the mechanism of action of natural and synthetic macromolecules, analyze the properties of blood, or investigate the structure and function of human organ systems.

A program incorporating engineering and the biological sciences can provide a sound foundation for a doctorate in medicine or dentistry, for a career in research, public health, biomedical engineering, or biotechnology, or for work as an engineer in a hospital or government agency.

The health-care, pharmaceutical, and biotechnology industries, in particular, seek individuals with a strong background in engineering supplemented by biological science education. Other career opportunities may include public health, the psychological sciences, and the marine sciences.

The biomedical engineering option has no fixed curriculum. Students work with an adviser to choose courses in the biological sciences that complement the standard engineering curriculum.

Chemical Engineering

Ralph A. Buonopane, PhD, *Associate Professor and Chair*

Professors

John A. Williams, PhD
Donald L. Wise, PhD,
Cabot Corporation
Professor of
Chemical Engineering

Associate Professors

Bernard M. Goodwin, ScD
Richard R. Stewart, PhD
Ronald J. Willey, PhD

Assistant Professor

Gilda A. Barabino, PhD
DiPietro Professor of
Chemical Engineering

The chemical engineering program offers students a broad education that stresses the fundamentals of science, technology, and engineering and incorporates state-of-the-art computer-aided design and management of production processes. An undergraduate degree in chemical engineering provides a solid background for graduate study or practice in the many diverse areas of chemical engineering found in industry.

Chemical engineers are creative problem-solvers whose work touches all our lives. They are involved in creating new wonder drugs and materials that improve life on earth and make space exploration a reality.

Petrochemicals, biomedicines, pharmaceuticals, agricultural chemicals, plastics, fibers, and synthetic fuels are among the materials of the modern world that are the results of chemical engineering. Chemical engineers work on ways to reduce acid rain and smog, to recycle and reduce wastes, to develop new sources of environmentally clean energy, and to use existing resources safely and efficiently. Chemical engineers not only develop new products, but also seek ways to reduce costs, increase production, and improve the quality of existing products.

Cooperative education and career opportunities for chemical engineering students are found in companies working with all of these technologies that touch our lives. As students gain more knowledge through co-op and academic work, cooperative education assignments increase in responsibility and challenge towards fully professional levels.

**Bachelor of Science
Curriculum**

Quarters 1-3	See above.
Quarter 4	CHE 1201, Chemical Engineering Calculations 1; CHE 1205, Computation Lab; CHM 1271, Organic Chemistry 1; MTH 1223, Calculus 4; and one social science/humanities elective.
Quarter 5	CHE 1202, Chemical Engineering Calculations 2; CHM 1272, Organic Chemistry 2 with Lab; MTH 1225, Differential Equations (Engineering) 1; and one social science/humanities elective.

Quarter 6	CHE 1211, Chemical Engineering Thermodynamics 1; CHM 1381, Physical Chemistry 1; CHM 1394, Experimental Physical Chemistry 1; MTH 1230, Linear Algebra; and one social science/humanities elective.
Quarter 7	CHE 1310, Chemical Engineering Thermodynamics 2; CHE 1321, Momentum Transport; CHM 1382, Physical Chemistry 2; CHM 1395, Experimental Physical Chemistry 2; and ENG 1125, Technical Writing 1.
Quarter 8	CHE 1415, Experimental Methods 1; CHE 1421, Chemical Engineering Kinetics; CHE 1431, Heat Transport; and ECN 1115, Principles of Macroeconomics.
Quarter 9	CHE 1416, Experimental Methods 2; CHE 1441, Separation Processes; CHE 1450, Chemical Engineering Economics; and one social science/humanities elective.
Quarter 10	CHE 1501, Process Design 1; CHE 1512, Chemical Process Control; one chemical engineering elective; and one engineering elective.
Quarter 11 (Spring only)	CHE 1502, Process Design 2; two chemical engineering electives; and one advanced chemistry elective.

Civil Engineering

Mishac K. Yegian, PhD, *Professor and Chair*

Professors

Frederic C. Blanc, PhD
John J. Cochrane, PhD
Constantine J. Gregory, PhD
Paul H. King, PhD
Kenneth M. Leet, ScD

Associate Professors

Dionisio Bernal, PhD
Peter G. Furth, PhD
Robert L. Meserve, MS
John G. Schoon, PhD
Richard J. Scranton, SM
Ali Touran, PhD
Irvine W. Wei, PhD

Assistant Professors

Mark D. Evans, PhD
Neven Krstulovic, PhD
Thomas C. Sheahan, ScD

Adjunct Professor

Sidney J. Wartel, JD

Civil engineers judiciously apply their knowledge of mathematics and physical sciences to improve and protect the environment and to provide facilities and structures for community living, industry, and transportation. Civil engineering encompasses several disciplines, including structural engineering, environmental engineering, transportation planning and engineering, and geotechnical engineering. Civil engineers supervise the construction of bridges, tunnels, buildings, dams, and aqueducts. Civil engineers plan, design, construct, and manage highways, railroads, canals, and airports; regulate rivers and control floods; design and build systems for water distribution, wastewater treatment, refuse disposal, and environmental remediation.

The civil engineering program offers a fundamental and rigorous yet flexible engineering education—an education that will weather inevitable changes within the field. The curriculum is intended to provide students with a solid background for careers in planning, design, construction, and engineering management. Students acquire a common base of knowledge in the engineering sciences, including structural mechanics, fluid mechanics, and environmental science. In more advanced courses, students learn to analyze and design structural systems (such as building frames and bridges), water and wastewater treatment systems, highways and mass transit systems, hydraulic systems, earth dams, and building foundations. Students use some of their electives to concentrate in one of four areas: structural, environmental, geotechnical, or transportation engineering.

Students also study the background within which they will practice engineering through a variety of courses in the social sciences and humanities, as well as specific courses dealing with law, professional ethics, and engineering management.

The co-op program parallels the academic program in level of responsibility and sophistication. A beginning job might involve layout at a construction site or laboratory testing; in senior level co-op assignments, students are often working alongside engineers on design teams.

Bachelor of Science Curriculum

Quarters 1–3	See page 92.
Quarter 4	CIV 1210, Structural Mechanics 1; CIV 1510, Materials; CIV 1511, Materials Lab; MTH 1223, Calculus 4; and one social science/humanities elective.
Quarter 5	CIV 1211, Structural Mechanics 2; CIV 1620, Engineering Measurements; CIV 1621, Engineering Measurements Lab; ECN 1116, Principles of Microeconomics; and MTH 1225, Differential Equations (Engineering) 1.
Quarter 6	CIV 1220, Structural Analysis 1; CIV 1226, Structural Analysis and Design Lab; CIV 1310, Fluid Mechanics; MTH 1230, Linear Algebra; and one social science/humanities elective.

Quarter 7	CIV 1240, Design of Reinforced Concrete Structures I; CIV 1340, Environmental Engineering I; CIV 1410, Soil Mechanics; CIV 1411, Soil Mechanics Lab; and ENG 1125, Technical Writing 1.
Quarter 8	CIV 1250, Design of Steel Structures I; ME 1320, Dynamics for Civil Engineers; and two technical electives.
Quarter 9	CIV 1665, Professional Issues for Civil Engineers; IIS 1366, Engineering Economy; CIV 1640, Applied Probability Theory for Civil Engineers; and two technical electives.
Quarter 10	Two technical electives; one social science/humanities elective; and one general elective.
Quarter 11	One capstone elective; two technical electives; and one social science/humanities elective.

Electrical and Computer Engineering

John G. Proakis, PhD, *William Lincoln Smith Professor and Chair*

Professors

Chung Chan, PhD
 Anthony J. Devaney, PhD
 James M. Feldman, PhD
 Samuel Fine, SM, MD
 Arvin Grabel, ScD
 Sarma S. Mulukutla, PhD
 Sheila Prasad-Hinchey, PhD
 J. Spencer Rochefort, MS
 Sheldon S. Sandler, PhD
 Martin E. Schetzen, ScD
 Philip E. Serafim, ScD
 Michael B. Silevitch, PhD
 Carmine Vittoria, PhD

Associate Professors

Soeren Buus, PhD
 Vinay Ingle, PhD
 Clas A. Jacobson, PhD
 Wayne G. Kellner, ScD
 Hanoeh Lev-Ari, PhD
 Robert N. Martin, MS
 Nicol E. McGruer, PhD
 Stephen W. McKnight, PhD
 Lazaros Merakos, PhD
 Ramachandran Raghavan, PhD
 Carey M. Rappaport, ScD
 Bahram Shafai, ScD
 Man-Kuan Vai, PhD
 Paul M. Zavracky, PhD

Assistant Professors

David Brady, PhD
 Dana Brooks, PhD
 Jill D. Crisman, PhD
 Edward W. Czeck, PhD
 Jeffrey A. Hopwood, PhD
 David R. Kaeli, PhD
 Anthony B. Maddox, PhD
 Elias S. Manolakos, PhD
 David J. McLaughlin, PhD
 Sampath Rangarajan, PhD
 Masoud Salehi, PhD
 Aleksandar M. Stankovic, PhD
 Gilead Tadmor, PhD

Lecturers

Jack I. Hanania, PhD
 Jacob Shekel, DSc

In electrical and computer engineering, students gain the knowledge and skills to address such problems as transferring and managing information, improving industrial productivity, conserving energy, and finding alternative energy sources. Electrical engineers have had a primary role in the development of the computer, integrated circuits, the pacemaker, satellite communication, space navigation, microprocessors, television, and the means of providing energy.

Some electrical engineers work in traditional areas of system design and development; others apply their skills in areas as diverse as ocean exploration, meteorology, transportation, experimental psychology, electronic music, health care systems, bioelectronics, and the development of educational devices for individuals with special needs.

The curriculum incorporates both information sciences, which focus on systems whose function is computation, communication, or control, and energy resources, which focus on the sources, generation, and distribution of large quantities of electrical energy.

The academic program is supported by extensive laboratory facilities for study and experimentation in computing, circuit analysis, electronics, digital systems, microwaves, control systems, semiconductor processing, VLSI design, digital signal processing, and power and energy conversion.

In addition to electrical engineering, the department offers options in computer engineering and power systems engineering. All options are based on a common core program, with a special concentration during the last two years of study. The computer engineering option allows specialization in designing and integrating digital computers within larger systems for communications, resource management, and automatic control. The power systems engineering option is conducted in cooperation with electric power companies in New England and other eastern states and allows students to specialize in energy resources.

In the cooperative work phase of the program, co-op jobs generally increase in the level of responsibility as students gain theoretical and technical knowledge through their academic work. A sophomore might begin cooperative work experience as an engineering assistant and progress by the senior year to a position with responsibilities similar to entry-level engineers.

**Option in
Computer Engineering**

For those who wish to specialize in designing and integrating digital computers within larger systems for communications, resource management, and automatic control, this option offers a basic but comprehensive knowledge of the principles underlying the organization, design, and applications of digital processing systems. Both hardware and software design are covered.

**Option in
Power Systems
Engineering**

This option is designed for students who wish to specialize in energy resources. The program is conducted in cooperation with electric power companies in New England and several eastern states.

**Bachelor of Science in
Electrical Engineering
Curriculum**

Quarters 1–3	See page 92.
Quarter 4	ECE 1215, Circuits and Systems 1; ECE 1221, Measurements Lab; MTH 1223, Calculus 4; PHY 1224, Physics 4; and one social science/humanities elective.
Quarter 5	ECE 1216, Circuits and Systems 2; ECE 1222, Circuits Lab 1; ME 1321, Mechanics for Electrical Engineers; MTH 1225, Differential Equations (Engineering) 1; and one social science/humanities elective.
Quarter 6	ECE 1217, Circuits and Systems 3; ECE 1223, Circuits Lab 2; ECE 1346, Electronics 1; ECE 1381, Computer Engineering 1; and ME 1340, Thermodynamics <i>or</i> ME 1386, Materials Science.
Quarter 7	ECE 1224, Electronics Lab 1; ECE 1229, Digital Systems Lab; ECE 1332, Linear Systems 1; ECE 1347, Electronics 2; ECE 1382, Computer Engineering 2; and ENG 1125, Technical Writing.
Quarter 8	ECE 1225, Electronics Lab 2; ECE 1226, Discrete Systems Lab; ECE 1333, Linear Systems 2; ECE 1349, Electronic Design 1; ECE 1363, Electromagnetic Field Theory 1; and ECE 1383, Computer Engineering 3.
Quarter 9	ECE 1227, Electromagnetic Fields Lab 1; ECE 1364, Electromagnetic Field Theory 2; MTH 1384, Probability for Engineering; one social science/humanities elective; and one technical elective.
Quarter 10	ECE 1228, Electromagnetic Fields Lab 2; ECE 1365, Electromagnetic Fields and Energy Conversion; ECE 1454, Communication Systems; one social science/humanities elective; and one technical elective.
Quarter 11	ECE 1408, Physical Electronics <i>or</i> ECE 1420, Control Systems and ECE 1235, Control Lab <i>or</i> ECE 1465, Wave Transmission and Reception; one social science/humanities elective; and two technical electives.

**Bachelor of Science in
Computer Engineering
Curriculum**

Quarter 1–3	See page 92.
Quarter 4	ECE 1215, Circuits and Systems 1; ECE 1221, Measurements Lab; MTH 1223, Calculus 4; PHY 1224, Physics 4; and one social science/humanities elective.
Quarter 5	ECE 1216, Circuits and Systems 2; ECE 1222, Circuits Lab 1; ME 1321, Mechanics for Electrical Engineers; MTH 1225, Differential Equations (Engineering) 1; and one social science/humanities elective.
Quarter 6	ECE 1217, Circuits and Systems 3; ECE 1223, Circuits Lab 2; ECE 1346, Electronics 1; ECE 1381, Computer Engineering 1; and ME 1340, Thermodynamics <i>or</i> ME 1386, Materials Science.
Quarter 7	ECE 1224, Electronics Lab 1; ECE 1229, Digital Systems Lab; ECE 1332, Linear Systems 1; ECE 1347, Electronics 2; ECE 1382, Computer Engineering 2; and ENG 1125, Technical Writing.
Quarter 8	ECE 1225, Electronics Lab 2; ECE 1226, Discrete Systems Lab; ECE 1333, Linear Systems 2; ECE 1349, Electronic Design 1; ECE 1363, Electromagnetic Field Theory 1; and ECE 1383, Computer Engineering 3.
Quarter 9	ECE 1227, Electromagnetic Fields Lab 1; ECE 1364, Electromagnetic Field Theory 2; ECE 1384, Computer Engineering 4; MTH 1384, Probability for Engineering; and one social science/humanities elective.
Quarter 10	ECE 1228, Electromagnetic Fields Lab 2; ECE 1230, VLSI Systems Design Lab; ECE 1351, Topics in IC Design; ECE 1365, Electromagnetic Fields and Energy Conversion; ECE 1454, Communication Systems; and one social science/humanities elective.
Quarter 11	Three technical electives and one social science/humanities elective.

**Bachelor of Science in
Power Systems
Engineering Curriculum**

Quarters 1–3	See page 92.
Quarter 4	ECE 1215, Circuits and Systems 1; ECE 1221, Measurements Lab; MTH 1223, Calculus 4; PHY 1224, Physics 4; and one social science/humanities elective.
Quarter 5	ECE 1216, Circuits and Systems 2; ECE 1222, Circuits Lab 1; ME 1321, Mechanics for Electrical Engineers; MTH 1225, Differential Equations (Engineering) 1; and one social science/humanities elective.
Quarter 6	ECE 1217, Circuits and Systems 3; ECE 1223, Circuits Lab 2; ECE 1346, Electronics 1; ECE 1381, Computer Engineering 1; and ME 1340, Thermodynamics 1.
Quarter 7	ECE 1224, Electronics Lab 1; ECE 1229, Digital Systems Lab; ECE 1332, Linear Systems 1; ECE 1347, Electronics 2; ECE 1382, Computer Engineering 2; and ENG 1125, Technical Writing.
Quarter 8	ECE 1225, Electronics Lab 2; ECE 1226, Discrete Systems Lab; ECE 1333, Linear Systems 2; ECE 1349, Electronic Design 1; ECE 1363, Electromagnetic Field Theory 1; and one social science/humanities elective.
Quarter 9 (Spring only)	ECE 1227, Electromagnetic Fields Lab 1; ECE 1364, Electromagnetic Field Theory 2; ECE 1471, Electrical Power Systems 1; MTH 1384, Probability for Engineering; and one social science/humanities elective.
Quarter 10 (Winter only)	ECE 1228, Electromagnetic Fields Lab 2; ECE 1231, Electrical Power Lab 1; ECE 1365, Electromagnetic Fields and Energy Conversion; ECE 1472, Electrical Power Systems 2; one social science/humanities elective; and one technical elective.
Quarter 11 (Spring only)	ECE 1232, Electrical Power Lab 2; ECE 1371, Electrical Machines 1; ECE 1379, Transients in Electrical Power Systems; ECE 1474, Power Electronics; and one technical elective.

General Engineering**Advisory Committee**Richard R. Stewart, PhD, *Chemical Engineering, Chair*Peter Furth, PhD, *Civil Engineering*Arvin Grabel, ScD, *Electrical Engineering*Ronald F. Perry, PhD, *Industrial Engineering*Mohamad Metghalchi, ScD, *Mechanical Engineering*

The goal of the general engineering program is to provide students with flexible, interdisciplinary opportunities to study basic engineering concepts plus courses in areas related to their interests, such as business or science.

This program is designed for students interested in engineering-related professions rather than a specific engineering discipline. It is highly elective and enables students to tailor their studies to meet their particular objectives. A general engineering background offers the foundation for advanced study in such areas as medicine, law, or business, particularly for those interested in the more technical aspects or applications of those professions. Students who complete an adviser-approved program receive an unspecified Bachelor of Science degree from the College of Engineering.

**Bachelor of Science
Curriculum**

Quarters 1–3	See page 92.
Quarter 4	MTH 1223, Calculus 4; one basic science elective; one engineering science elective; and one social science/humanities elective.
Quarter 5	MTH 1225, Differential Equations (Engineering) 1; one engineering science elective; one coordinated study elective; and one social science/humanities elective.
Quarter 6	ENG 1340, Writing Workshop 1; one engineering science elective; two coordinated study electives; and one social science/humanities elective.
Quarter 7	Two engineering science electives; one coordinated study elective; and one social science/humanities elective.
Quarter 8	Two engineering science electives and two coordinated study electives.
Quarter 9	Two engineering science electives and two coordinated study electives.
Quarter 10	Two engineering science electives and two coordinated study electives.
Quarter 11	One engineering science elective and three coordinated study electives.

Industrial Engineering and Information Systems

Thomas P. Cullinane, PhD, *Professor and Acting Chair*

Professors

Stuart J. Deutsch, PhD
Ronald R. Mourant, PhD

Associate Professors

Nasser Fard, PhD
Surendra M. Gupta, PhD
Thomas E. Hulbert, MS
Mieczyslaw M. Kokar, PhD
Emanuel S. Melachrinoudis, PhD
Ronald F. Perry, PhD
Gerard Voland, PhD
Ching-Cheng Wang, PhD

Assistant Professors

M. Louis Brennan, PhD
Mary E. Helander, PhD
Anthony B. Maddox, PhD

Industrial engineering involves the design and analysis of systems that include people, equipment, and materials and their interactions and performance in the workplace. The industrial engineer collects this information and evaluates alternatives to make decisions that best advance the goals of the enterprise.

The program in industrial engineering and information systems offers students a base of traditional engineering courses such as production systems, work design, probability, statistics, and engineering economy, while emphasizing such contemporary areas as simulation, material handling, computer software, quality control, and operations research.

To gain the skills they need to make informed managerial and professional decisions, students take courses in management, economics, and technical subjects, as well as in the humanities and social sciences.

Industrial engineers work in manufacturing firms, hospitals, banks, public utilities, government agencies, insurance companies, and construction firms. Among the projects they undertake are design and implementation of a computer-integrated manufacturing system, design of a robotics system in a manufacturing environment, long-range corporate planning, development and implementation of a quality-control system, design of workstations to enhance worker safety and productivity, and development of computer systems for information control.

Co-op jobs generally increase in level of responsibility as students gain theoretical and technical knowledge through their academic work. A sophomore might begin as a computer analyst evaluating the performance of a manufacturing system and progress to designing manufacturing engineering workstations by the senior year.

Bachelor of Science Curriculum

Quarters 1-3	See page 92.
Quarter 4	ECN 1115, Principles of Macroeconomics; IIS 1200, Work Design; MTH 1223, Calculus 4; and one behavioral science, social science, or humanities elective.
Quarter 5	ECN 1116, Principles of Microeconomics; IIS 1330, Computation and Programming I; ME 1201, Statics; and MTH 1225, Differential Equations (Engineering) I.
Quarter 6	ECE 1171, Electrical Engineering I; IIS 1300, Probabilistic Analysis for Engineers; and MTH 1230, Linear Algebra; and one engineering science elective.
Quarter 7	IIS 1360, Engineering Economy; one technical elective; one behavioral science, social science, or humanities elective; and one open elective.
Quarter 8	IIS 1310, Statistics; IIS 1340, Operations Research 1; IIS 1475, Human-Machine Systems; and HRM 1431, Complex Organizations.
Quarter 9	IIS 1341, Operations Research 2; IIS 1350, Digital Simulation Techniques; ENG 1125, Technical Writing; one engineering science elective; and one behavioral science, social science, or humanities elective.
Quarter 10	IIS 1405, Production and Inventory Control; IIS 1436, Quality Assurance; and two technical electives.
Quarter 11	IIS 1401, Design Project; two IIS technical electives; and one behavioral science, social science, or humanities elective.

Mechanical Engineering

John W. Cipolla, Jr., PhD, *Professor and Chair*

Professors

George G. Adams, PhD
Charles A. Berg, ScD
Alexander M. Gorlov, PhD
Richard J. Murphy, PhD
Hamid Nayeib-Hashemi, PhD
John N. Rossettos, PhD
Mohammad E. Taslim, PhD
Yaman Yener, PhD
Ibrahim Zeid, PhD

Associate Professors

Charles W. Finn, PhD
Olusegun J. Ilegbusi, PhD
Gregory J. Kowalski, PhD
Yiannis A. Leventidis, PhD
Achille Messac, PhD
Mohamad Metghalchi, ScD
Uichiro Narusawa, PhD

Assistant Professors

Andrew V. Tangborn, PhD
Charles S. White, PhD
Mary Grace Williams, PhD
Bruce H. Wilson, PhD

Professors Emeriti

Ralph S. Blanchard, MS
Arthur R. Foster, MEng
Bertram S. Long, MEng
Welville B. Nowak, PhD
Alvin J. Yorra, MS
John Zotos, MEng

Senior Research Engineer

Joseph T. Blucher, PhD

Mechanical engineering involves the design, development and manufacture of machinery and devices to transmit power or to convert energy from thermal to mechanical form in order to power the modern world and its machines. Its current practice has been heavily influenced by recent advances in computer hardware and software.

Mechanical engineers use computers to formulate preliminary and final designs of systems or devices, to perform calculations that predict the behavior of the design, and to collect and analyze performance data from system testing or operation.

Traditionally, mechanical engineers have designed and tested such devices as heating and air-conditioning systems, machine tools, internal combustion engines, and steam power plants. Today they also play primary roles in the development of new technologies in a variety of fields—energy conversion, solar energy utilization, environmental control, prosthetics, transportation, manufacturing, and new materials development.

The curriculum in mechanical engineering focuses on three areas: applied mechanics, thermofluids engineering, and materials science. Applied mechanics is the study of the motion and deformation of the structural elements acted on by forces in devices that range from rotating industrial dynamos to dentists' drills. Thermofluids engineering deals with the motion of fluids and the transfer of energy, as in the cooling of electronic components or the design of gas turbine engines. Materials science is concerned with the relationship between the structure and properties of materials and with the control of structure, through processing, to achieve the desired properties. Practical applications are in the development of composite materials and in metallurgical process industries.

Courses in each area form the foundation for advanced analytical and creative design courses that culminate in a two-quarter senior design project. Faculty encourage students throughout the curriculum to use computer-aided design tools and high-performance computer workstations.

Cooperative education assignments increase in responsibility and technical challenge as students progress through the program. Initial positions may involve computer intensive CAD/CAM assignments or programming tasks, while more advanced jobs will place students in charge of quality control systems and performance testing of equipment.

Bachelor of Science Curriculum

Quarters 1–3	See page 92.
Quarter 4	ECN 1115, Principles of Macroeconomics or ECN 1116, Principles of Microeconomics; ME 1201, Statics; ME 1360, Thermodynamics 1; and MTH 1223, Calculus 4.
Quarter 5	ME 1392, Measurement and Analysis; ME 1202, Dynamics 1; ME 1361, Thermodynamics 2; and MTH 1225, Differential Equations (Engineering) 1.
Quarter 6	ENG 1340, Writing Workshop; ME 1203, Strength of Materials 1; ME 1315, Dynamics 2; ME 1375, Fluid Mechanics 1; and MTH 1226, Differential Equations (Engineering) 2.
Quarter 7	ME 1314, Strength of Materials 2; ME 1365, Heat Transfer; MTH 1230, Linear Algebra; and ME 1380, Materials Science.
Quarter 8	ME 1335, Mechanical Design; ME 1362, Thermodynamics 3; ME 1480, Mechanical Behavior of Materials; or ECE 1171, Electrical Engineering; and one social science/humanities elective.
Quarter 9	ME 1337, Thermal Design; ME 1415, Mechanical Vibrations; ME 1483, Materials Processing or ECE 1171, Electrical Engineering; and one social science/humanities elective.

Quarter 10	ME 1336, Design Project 1; two technical electives*; and one social science/humanities elective.
Quarter 11	ME 1338, Design Project 2; two technical electives*; and one social science/humanities elective.

*An approved physics/science elective must be taken in either quarter 10 or quarter 11.

Part-Time Evening Engineering

The Part-Time Engineering Program is designed to meet the needs of individuals who must combine full-time work responsibilities with part-time evening study. This six-year, part-time evening curriculum leads to a degree of Bachelor of Science in civil, electrical, or mechanical engineering. Admissions and course requirements are identical to the full-time, five-year cooperative degree programs. For an application and more information contact 220 Snell, 373-2185. The program coordinator is Caryn Vigoda, MEd.

Part-Time Evening Curriculum for Bachelor of Science

All programs follow the same curriculum for years one and two.

First Year	Fall Quarter	GE 1101, Problem Solving and Computation and MTH 1123, Calculus 1.
	Winter Quarter	CHM 1131, Chemistry 1; GE 1102, Problem Solving with Application Software; and MTH 1124, Calculus 2.
	Spring Quarter	CHM 1132, Chemistry 2 and MTH 1125, Calculus 3.
Second Year	Fall Quarter	MTH 1223, Calculus 4; PHY 1221, Physics 1; and PHY 1521, Physics 1 Lab.
	Winter Quarter	MTH 1225, Differential Equations (Engineering) 1; and PHY 1222, Physics 2.
	Spring Quarter	GE 1103, Engineering Graphics and Design; PHY 1223, Physics 3; and PHY 1522, Physics 2 Lab.

Part-Time Evening Curriculum for Bachelor of Science in Civil Engineering

Third Year	Fall Quarter	CIV 1210, Structural Mechanics 1; and CIV 1620, Engineering Measurements <i>or</i> CIV 1340, Environmental Engineering 1.
	Winter Quarter	CIV 1211, Structural Mechanics 2; MTH 1230, Linear Algebra <i>or</i> CIV 1640, Applied Probability Theory for Civil Engineers; and CIV 1625, Civil Engineering Computations Lab.
	Spring Quarter	CIV 1310, Fluid Mechanics; CIV 1410, Soil Mechanics and CIV 1411, Soil Mechanics Lab <i>or</i> CIV 1510, Materials and CIV 1511, Materials Lab.
Fourth Year	Fall Quarter	CIV 1220, Structural Analysis 1; and CIV 1620, Engineering Measurements <i>or</i> CIV 1340, Environmental Engineering 1.
	Winter Quarter	CIV 1240, Design of Reinforced Concrete Structures 1; CIV 1625, Civil Engineering Computations Lab; and MTH 1230, Linear Algebra <i>or</i> CIV 1640, Applied Probability Theory for Civil Engineers.
	Spring Quarter	CIV 1310, Fluid Mechanics; and CIV 1410, Soil Mechanics and CIV 1411, Soil Mechanics Lab <i>or</i> CIV 1510, Materials and CIV 1511, Materials Lab.

Environmental Concentration

Fifth and Sixth Years	CIV 1245, Advanced Structure Design; CIV 1320, Hydraulic Engineering; CIV 1341, Environmental Engineering 2; CIV 1350, Environmental/Hydraulic Lab; CIV 1395, Environmental Design Project; CIV 1420, Foundation Engineering; CIV 3636, Transportation Engineering; CIV 3642, Transportation Planning; IIS 1366, Engineering Economy; ME 1320, Dynamics; ME 1340, Thermodynamics; and a general elective.
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Structural Concentration

Fifth and Sixth Years	CIV 1222, Structural Analysis 2; CIV 1245, Advanced Structure Design; CIV 1295, Structural Design Project; CIV 1320, Hydraulic Engineering; CIV 1341, Environmental Engineering 2; CIV 1420, Foundation Engineering; CIV 3636, Transportation Engineering; CIV 3642, Transportation Planning; IIS 1366, Engineering Economy; ME 1320, Dynamics; ME 1340, Thermodynamics; and a general elective.
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Part-Time Evening Curriculum for Bachelor of Science in Electrical and Computer Engineering	Third Year	Summer Quarters	During the summer quarters students are expected to take ENG 1111, Freshman English 2; ENG 1113, Great Themes in Literature; ECN 1116, Principles of Microeconomics; ENG 1125, Technical Writing; four adviser-approved social science/humanities electives; and CIV 1665, Professional Issues in Civil Engineering.
		Fall Quarter	ECE 1215, Circuits and Systems 1; ECE 1221, Measurements Lab; and PHY 1224, Physics 4.
		Winter Quarter	ECE 1216, Circuits and Systems 2; ECE 1222, Circuits Lab 1; and ME 1321, Mechanics for Electrical Engineers.
		Spring Quarter	ECE 1217, Circuits and Systems 3; ECE 1223, Circuits Lab 2; and MTH 1384, Probability.
	Fourth Year	Fall Quarter	ECE 1332, Linear Systems 1 and ECE 1346, Electronics 1.
		Winter Quarter	ECE 1224, Electronics Lab 1; ECE 1226, Discrete Systems Lab 1; ECE 1333, Linear Systems 2; and ECE 1347, Electronics 2.
		Spring Quarter	ECE 1225, Electronics Lab 2; ECE 1349, Electronic Design 1; and ME 1340, Thermodynamics 1 or ME 1386, Materials Science.
	Fifth Year	Fall Quarter	ECE 1363, Electromagnetic Field Theory 1 and ECE 1381, Computer Engineering 1.
		Winter Quarter	ECE 1227, Electromagnetic Field Lab; ECE 1229, Digital Systems Lab; ECE 1364, Electromagnetic Field Theory 2; and ECE 1382, Computer Engineering 2.
		Spring Quarter	ECE 1228, Electromagnetic Field and Energy Conversion Lab 2; ECE 1365, Electromagnetic Fields and Energy Conversion; and ECE 1383, Computer Engineering 3.
	Sixth Year	Fall Quarter	Choose two technical electives from the following. ECE 1351, Special Topic IC Design and ECE 1230, VLSI System Design Lab; ECE 1408, Physical Electronics; ECE 1471, Electrical Power Systems 1; or ECE 1486, Numerical Methods and Computer Applications.
		Winter Quarter	Choose two technical electives from the following. ECE 1420, Control Systems and ECE 1235, Control Systems Lab; ECE 1384, Computer Engineering 4; ECE 1472, Electrical Power Systems 2 and ECE 1231, Electric Power Lab or MTH 1351, Function of a Computer Variable.
		Spring Quarter	ECE 1454, Communication Systems; ECE 1456, Digital Signal Processing and ECE 1234, Digital Signal Processing Lab or ECE 1465, Wave Transmission and Reception.
		Summer Quarters	During the summer quarters students are expected to take ENG 1111, Freshman English 2; ENG 1113, Great Themes in Literature; five adviser-approved social science/humanities electives; and ENG 1125, Technical Writing.
Part-Time Evening Curriculum for Bachelor of Science in Mechanical Engineering	Third Year	Fall Quarter	ME 1201, Statics and PHY 1224, Physics 4.
		Winter Quarter	ME 1392, Measurements and Analysis and MTH 1230, Linear Algebra.
		Spring Quarter	MTH 1226, Mathematical Analysis 2 and ME 1360, Thermodynamics 1.
	Fourth Year	Fall Quarter	ME 1203, Strength of Materials 1 and ME 1361, Thermodynamics 2.
		Winter Quarter	ME 1202, Dynamics 1 and ME 1375, Fluid Mechanics.
		Spring Quarter	ME 1314, Strength of Materials 2 and ME 1365, Heat Transfer.

Fifth Year	Fall Quarter	ME 1335, Mechanical Design and ME 1337, Thermal Design.
	Winter Quarter	ME 1336, Design Project 1 and ME 1380, Materials Science.
	Spring Quarter	ME 1338, Design Project 2 and ME 1480, Mechanical Behavior of Materials.
	Summer Quarter	An additional ME technical elective is required in the summer following the fifth year.
Sixth Year	Fall Quarter	ECE 1171, Electrical Engineering 1 and ME 1362, Thermodynamics 3.
	Winter Quarter	ENG 1340, Writing Workshop; ME 1315, Dynamics 2; and one technical elective.
	Spring Quarter	ME 1415, Mechanical Vibrations; and one technical elective.
	Summer Quarters	During the summer quarters students are expected to take ENG 1111, Freshman English 2; ENG 1113, Great Themes in Literature; ECN 1115, Principles of Macroeconomics or ECN 1116, Principles of Microeconomics; and four adviser-approved social science/humanities electives.

School of Engineering Technology

Thomas E. Hulbert, MS, PE, *Director and Associate Dean of Engineering*

Roy Dalsheim, BS, *Assistant Director*

Rasma Galins, *Assistant Director*

Rosanne L. Bogan, BS, *Staff Assistant*

Professor

Samuel Fine, MD
*Electrical Engineering
Technology*

Associate Professors

David S. Goldman, MS, PE
Computer Technology
Eric W. Hansberry, MS
Design Graphics

George F. Kent, MS, MBA, PE
*Mechanical Engineering
Technology*
Nonna K. Lehmkuhl, MEd, MS
Computer Technology

Assistant Professors

John E. Hajjar, PhD
Computer Technology
Frederick J. Nohmer, EdD
*Electrical Engineering
Technology*

Lecturers

Masoud Olia, PhD
*Mechanical Engineering
Technology*
Ronald E. Scott, ScD, PE
*Electrical Engineering
Technology*
Jerome Tapper, BS, PE
*Electrical Engineering
Technology*

The programs in the School of Engineering Technology concentrate on the applications of technology and emphasize the rational processes involved in converting theories and ideas into practical techniques, procedures, and products. Fundamentals are related to current practice, providing a supportive "why" for the practical "how." The study of the humanities and social sciences helps students gain a balanced, well-rounded education.

Engineering technologists work with professional engineers, scientists, medical doctors, supervisors, and craftspersons to develop techniques for converting scientific knowledge and craftsmanship into products. The curriculum helps students understand the scientific principles that govern current technology; apply technology to problem solving; communicate effectively the important implications of technological advances; and acquire the motivation for continued development of technical skills.

The school offers five-year cooperative education programs in mechanical engineering technology, electrical engineering technology, and computer technology—all leading to the degree of Bachelor of Science in Engineering Technology. A firm choice of major may be delayed until the spring quarter of the freshman year.

For transfer students, the school offers a three-year Bachelor of Science degree program with a major in aerospace maintenance engineering technology.

The electrical and mechanical engineering technology baccalaureate day programs and the part-time baccalaureate programs in mechanical, mechanical-structural, and electrical engineering technology are accredited by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology (TAC/ABET). The part-time program leading to an Associate of Science in engineering degree with majors in electrical and mechanical engineering technology are also accredited by TAC/ABET.

Part-Time Evening and Weekend Programs

The part-time programs include courses and degree programs leading to the Associate in Engineering (AE), the Associate in Science (AS), and the Bachelor of Science in Engineering Technology (BSET). The AE degree may be earned in computer technology and in environmental, structural, survey and highway, electrical, and mechanical engineering technology. The AS degree may be earned in telecommunications.

Students may also earn the BSET in computer technology, mechanical, electrical, mechanical-structural, or manufacturing engineering technology. A degree in aerospace maintenance engineering technology is available for transfer students who have completed an airframe and power plant curriculum.

For more information on part-time programs, contact Northeastern University, School of Engineering Technology, 120 Snell Engineering Center, Boston, MA 02115; or call 617-373-2500 (voice), 617-373-8526 (TTY), or 617-373-2501 (FAX).

Class Entrance Requirements

The minimum overall quality-point averages listed are required for students to advance to the next rank and to graduate.

Sophomore	1.4
Middler	1.6
Junior	1.8
Senior	2.0
To graduate	2.0

A cumulative quality-point average of 2.0 or better in major courses is required for graduation. Students are expected to carry the normal prescribed curriculum for the program. Details on criteria for academic probation and suspension are available at 120 Snell Engineering Center.

Graduation Requirement

Students transferring from another college or university are not eligible to receive the degree until they have completed at least one academic year at Northeastern immediately preceding their graduation.

For more information about programs and requirements, refer to the School of Engineering Technology bulletin, available at 120 Snell Engineering Center.

Minor in Computer Technology (pending final approval)

To qualify for a minor in computer technology, the student must complete the following six courses and one laboratory. A student does not have to be enrolled in the School of Engineering Technology to declare the minor, but the student must meet the published prerequisites for all courses.

The required courses are: CT 1311, "C" Language; CT 1330, Data Structures; CT 1320, FORTRAN Lab; CT 1345, Assembly Language; CT 1340, Software Engineering; CT 1381, Operating Systems; CT 1393, UNIX.

Minor in Electrical Engineering Technology (pending final approval)

To qualify for a minor in electrical engineering technology, the student must complete the following five courses and three laboratories. A student does not have to be enrolled in the School of Engineering Technology to declare the minor, but the student must meet the published prerequisites for all courses.

The required courses are: EET 1151, Circuit Analysis 1; EET 1152, Circuit Analysis 2; EET 1324, Circuit Lab 1; EET 1325, Circuit Lab 2; EET 1311, Electronics 1; EET 1312, Electronics 2; EET 1323, Electronics Lab; EET 1330, Energy Conversion; or EET 1377, Control Engineering 1.

Minor in Mechanical Engineering Technology (pending final approval)

To qualify for a minor in mechanical engineering technology, the student must complete the following six courses and two laboratories. A student does not have to be enrolled in the School of Engineering Technology to declare the minor, but the student must meet the published prerequisites for all courses.

The required courses are: MET 1301, Mechanics A; MET 1302, Mechanics B; MET 1314, Stress Analysis A; MET 1370, Fluid Mechanics A; MET 1390, Measurements and Analysis Lab; MET 1340, Thermodynamics A; MET 1380, Materials A; MET 1391, Tech Lab A.

To obtain credit for a minor in engineering technology, students must file a petition form with the School of Engineering Technology in 120 Snell Engineering Center. Interested students should confer with an adviser as soon as possible. Advisers are Dean Thomas Hulbert and Mr. Roy Dalsheim, 120 Snell, 617-373-2500.

Aerospace Maintenance Engineering Technology

For transfer students the school offers a three-year Bachelor of Science in Engineering Technology degree with a major in aerospace maintenance engineering technology. This program, designed in conjunction with East Coast Aero Technical School, is for students who have successfully completed a program in aircraft and power-plant mechanics or similar technician programs.

To enter the program, students must pass college algebra, precalculus, calculus 1, and chemistry. During their three years of study, students participate in the cooperative education program.

These students have in their possession various federal licenses and qualify for exceptional cooperative education experiences with a number of aerospace firms involved with national defense and space exploration. They are especially sought after by co-op employers dealing with airframe integrity and power plant configuration.

Graduates of this program are prepared to pursue technical, support, or management positions in the aircraft industry. They may also become members of engineering teams in spacecraft or aircraft component manufacturing. Other graduates of the program may assume design/applications positions in either civilian or military aerospace markets.

Bachelor of Science Curriculum

Quarter 1	GET 1105, Computer Applications; GET 1170, Engineering Graphics 1; MTH 1194, Calculus 2; PHY 1191, Physics 1; and PHY 1196, Physics Lab 1.
Quarter 2	ENG 1110, Freshman English 1; GET 1171, Engineering Graphics 2; PHY 1192, Physics 2; PHY 1197, Physics Lab 2; and one social science/humanities elective.
Quarter 3	ENG 1111, Freshman English 2; MET 1380, Materials A; MTH 1195, Calculus 3; PHY 1193, Physics 3; and PHY 1198, Physics Lab 3.

Quarter 4	ECN 1115, Principles of Macroeconomics; EET 1320, Electricity and Electronics 1; MET 1301, Mechanics A; CMN 1115, Foundations of Communication; and GET 1100, Computer Programming.
Quarter 5	ENG 1125, Technical Writing; MET 1302, Mechanics B; MET 1314, Stress Analysis A; and one social science/humanities elective.
Quarter 6	MET 1340, Thermodynamics A; MET 1370, Fluid Mechanics A; MET 1390, Measurement and Analysis Lab; MET 1481, Materials B; and one technical elective.
Quarter 7	MET 1341, Thermodynamics B; MET 1391, Technology Lab A; one technical elective; and two social science/humanities electives.

Computer Technology

Nonna K. Lehmkuhl, MEd, MS, *Coordinator for Computer Technology*

Computer technology's major functions include programming the computer for engineering, scientific, and business applications; designing, engineering, and testing computers; and interfacing computers with various types of equipment to enhance automation.

The computer technology program provides degree candidates with both academic and technical learning experience relevant to the hardware and software systems currently used in industry. Students also choose technical electives in their area of interest. High-level theory courses enable students to continue their educational and professional development beyond the baccalaureate level. Some students go on to pursue master's degrees in either business administration or information systems.

A typical sophomore's cooperative education responsibilities might include setting up and configuring various computer platforms, installing software packages, providing phone support for technical inquiries, and performing elementary network troubleshooting and some software research. Other typical positions explore the various aspects of manufacturing processes, including assembly and quality assurance.

As seniors, typical students have progressed to more sophisticated and challenging assignments. They may be assigned the responsibility of maintaining entire software applications as well as the databases for these programs, or they may be asked to convert old versions of application scripts to conform to new coding principles. Other assignments may include providing advanced technical software and hardware support for end users both on and off site.

Graduates of this program are equipped to play important roles on engineering support teams that implement engineering design projects. They also work closely with engineers as members of research and production teams.

Bachelor of Science Curriculum

Quarter 1	GET 1105, Computer Applications; GET 1170, Engineering Graphics 1; MTH 1191, College Algebra; PHY 1191, Physics 1; and PHY 1196, Physics 1 Lab.
Quarter 2	ENG 1110, Freshman English 1; GET 1100, Computer Programming for Engineering Technology; MTH 1192, Pre-Calculus; PHY 1192, Physics 2; and PHY 1197, Physics 2 Lab.
Quarter 3	CT 1150, Computer Organization; MTH 1193, Calculus 1; PHY 1193, Physics 3; PHY 1198, Physics Lab 3; and ENG 1111, Freshman English 2.
Quarter 4	CT 1311, Programming in C Language; ECN 1115, Principles of Macroeconomics; EET 1151, Circuit Analysis 1; and MTH 1194, Calculus 2.
Quarter 5	CT 1315, FORTRAN Lab; CT 1330, Data Structures; EET 1152, Circuit Analysis 2; MTH 1195, Calculus 3; and one social science/humanities elective.
Quarter 6	CT 1335, Numerical Methods; CT 1340, Software Engineering; CT 1345, Assembly Language; and CMN 1115, Speech Communications.
Quarter 7	ENG 1125, Technical Writing; CT 1368, Semiconductor Logic; CT 1374, Introduction to CPU Hardware; and CT 1381, Operating Systems.
Quarter 8	CT 1369, Computer Logic; CT 1375, CPU Hardware Architecture; one computer technology elective; and one social science/humanities elective.
Quarter 9	CT 1355, Microprocessor Peripheral Hardware; CT 1380, Data Communication Methods; two computer technology electives.
Quarter 10	CT 1356, Complex Peripheral Hardware; CT 1360, Industry Software; one computer technology elective; and one social science/humanities elective.
Quarter 11	CT 1351, Advanced Computer Organization; CT 1365, Industry Hardware; one technical elective; and one social science/humanities elective.

Electrical Engineering Technology

Ronald E. Scott, ScD, PE, *Coordinator for Electrical Engineering Technology*

The focus of electrical engineering technology is the design and operation of equipment and systems related to power, communications, data processing, and electrical control. Its major functions include generating, transmitting, and distributing electrical energy for light and power purposes; developing and producing equipment for telephone, radio, television, radar, and communication; designing and constructing data-processing systems and analog or digital computers; and applying electrical and electronic devices in the control of processes and manufacturing.

The program in electrical engineering technology offers theory courses at the upper end of the technology spectrum, and students may take technical electives in areas that interest them.

A sophomore may be given the cooperative education assignment of creating and editing electrical blueprints, doing shell drawings, or providing ductwork drawings along with the appropriate heat loading calculations for companies engaged in electrical construction. Other entry positions include assembly, bread boarding, inspection, and quality assurance.

Seniors typically have progressed to positions of much greater responsibility, such as installing and maintaining computer network systems, maintaining on-line base maps for public utility systems, and coordinating architectural and electrical plans with construction companies and suppliers. Students have also had co-op positions in consulting engineering firms as analysts, telemarketers in sales engineering, and environmental safety compliance officers.

Bachelor of Science Curriculum

Quarter 1	GET 1105, Computer Applications; GET 1170, Engineering Graphics 1; MTH 1191, College Algebra; PHY 1191, Physics 1; and PHY 1196, Physics Lab 1.
Quarter 2	ENG 1110, Freshman English 1; GET 1100, Computer Programming for Engineering Technology; MTH 1192, Pre-Calculus; PHY 1192, Physics 2; and PHY 1197, Physics Lab 2.
Quarter 3	GET 1171, Engineering Graphics 2; MTH 1193, Calculus 1; PHY 1193, Physics 3; PHY 1198, Physics Lab 3; and ENG 1111, Freshman English 2.
Quarter 4	CMN 1115, Foundations of Communication; EET 1151, Circuit Analysis 1; MTH 1194, Calculus 2; and one social science/humanities elective.
Quarter 5	EET 1123, Circuits Lab 1; EET 1152, Circuit Analysis 2; MET 1319, Mechanics; MTH 1195, Calculus 3; and one social science/humanities elective.
Quarter 6	EET 1125, Circuits Lab 2; EET 1311, Electronics 1; EET 1353, Circuit Analysis 3; EET 1360, Engineering Analysis 1; and ENG 1125, Technical Writing.
Quarter 7	EET 1310, Electrical Measurement; EET 1312, Electronics 2; EET 1323, Electronics Lab; EET 1354, Circuit Analysis 4; and ECN 1115, Macroeconomics.
Quarter 8	EET 1313, Electronics 3; EET 1327, Advanced Electronics Lab 1; EET 1330, Energy Conversion; one technical elective; and one social science/humanities elective.
Quarter 9	EET 1314, Pulse and Digital 1; EET 1328, Advanced Electronics Lab 2; EET 1337, Distributed Systems; one technical elective; and one social science/humanities elective.
Quarter 10	EET 1329, Advanced Electronics Lab 3; EET 1370, Digital Computers 1; EET 1377, Control Engineering 1; one technical elective.
Quarter 11	EET 1371, Digital Computers 2; EET 1378, Control Engineering 2; one technical elective; and one social science/humanities elective.

Mechanical Engineering Technology

George F. Kent, MS, PE, *Coordinator for Mechanical Engineering Technology*

As a technical field that deals with the use of machinery to harness power resources and perform useful work, mechanical engineering technology focuses on static forces, motion, and the kinetics of devices activated by hydraulic, electrical, mechanical, or thermodynamic forces.

Mechanical engineering technologists design and install machinery ranging from pocket watches to the largest energy-producing facilities. They help develop and produce engines and transport equipment such as automobiles, aircraft, ships, and railway cars. They also help construct and operate furnaces, boilers, and heating and air-conditioning equipment.

Students in mechanical engineering technology apply the principles of science and mathematics to their chosen fields and convert theories into practical techniques and processes. They learn how to communicate technical information effectively so they may become integral members of an engineer-technologist-technician design and operations team.

Sophomore mechanical engineering technology majors generally are referred to cooperative education positions such as technicians in facility or plant engineering departments, quality assurance positions in light and heavy manufacturing, and prototype development and design teams. A sophomore often will be given the responsibility of drawing mechanical designs and blueprints using various CAD software.

As seniors, these students have progressed to highly responsible positions in manufacturing and production, such as design and test technicians and field service engineers.

Bachelor of Science Curriculum

Quarter 1	GET 1105, Computer Applications; GET 1100, Computer Programming for Engineering Technology; GET 1170, Engineering Graphics 1; MTH 1191, College Algebra; PHY 1191, Physics 1; and PHY 1196, Physics 1 Lab.
Quarter 2	ENG 1110, Freshman English 1; GET 1100, Computer Programming for Engineering Technology <i>or</i> GET 1170, Engineering Graphics 1; MTH 1192, Pre-Calculus; PHY 1192, Physics 2; and PHY 1197, Physics 2 Lab.
Quarter 3	GET 1171, Engineering Graphics 2; MTH 1193, Calculus 1; PHY 1193, Physics 3; PHY 1198, Physics Lab 3; and ENG 1111, Freshman English 2.
Quarter 4	EET 1320, Electricity and Electronics; GET 1364, Kinematics; MET 1301, Mechanics A; and MTH 1194, Calculus 2.
Quarter 5	CHM 1130, Fundamentals of Chemistry; CHM 1138, General Chemistry Lab; MET 1302, Mechanics B; MET 1314, Stress Analysis A; and MTH 1195, Calculus 3.
Quarter 6	CMN 1115, Foundations of Communication; MET 1303, Mechanics C; MET 1315, Stress Analysis B; MET 1340, Thermodynamics A; and MET 1390, Measurement and Analysis Lab.
Quarter 7	ENG 1125, Technical Writing 1; MET 1341, Thermodynamics B; MET 1370, Fluid Mechanics A; MET 1380, Materials A; and MET 1391, Technology Lab A.
Quarter 8	MET 1330, Mechanical Design A; MET 1371, Fluid Mechanics B; MET 1392, Technology Lab B; MET 1396, Machine Shop or IIS ____ elective; and ECN 1115, Macroeconomics.
Quarter 9	MET 1331, Mechanical Design B; MET 1343, Heat Transfer; MET 1393, Technology Lab C; one technical elective; and one social science/humanities elective.
Quarter 10	MET 1366, Engineering Economy; MET 1394, Technology Lab D; MET 1481, Materials B or MET 1416, Stress Analysis C; one technical elective; and one social science/humanities elective.
Quarter 11	MET 1343, Heat Transfer; MET 1395, Technology Lab E; and two social science/humanities electives.

College of Nursing

Eileen H. Zungolo, MED, EdD, RN, *Dean*

Carole Shea, MS, PhD, RN, *Associate Dean and Director of Graduate School*

Janet A. Carroll, MS, RN, *Assistant Dean of Administration*

Christine Letzeiser, MS, RN, *Assistant Dean of Student Affairs*

Associate Professors

Jane F. Aroian, MSN, EdD, RN

Olivia M. Breton, MEd, RN

Elaine L. Capozzoli, MA, PhD, RN

Margery M. Chisholm, MS, EdD, RN

Ellen T. Daly, MS, EdD, RN

M. Paula Fellows, MS, RN

Jean P. Gilbert, MS, EdD, RN

Dorett Hope, MEd, EdD

M. Marcia Lynch, MSN, DNSc, RN

Susan C. Marchessault, MSN, RN

Geraldine A. Medici, MS, RN

Patricia Meserve, MS, PhD, RN

Marilyn M. Smith, MS, MBA, RN

Mary E. Wilcox, MS, RN

M. Delaine Williamson, MS, MPH, RD

Assistant Professors

Anne Bateman, MSN, RN

Michelle Beauchesne, MS, DNSc, RN

Nancy N. Carr, MS, RN

Mary Anne Gauthier, MSN, EdD, RN

Elizabeth M. Howard, MS, PhD, RN

Barbara Kelley, MS, MPS, EdD, RN

Peggy Matteson, MS, PhD, RN

Kathleen Miller, EdD, MS

Donna Newby, MSN, PhD, RN

Carol Williams, MS, DNSc, RN

Visiting Professor

Margaret Mahoney, PhD, MS, RN

Lecturers

Elaine Gardner, MS, RN

Margaret McAllister, MA, SpCIN, RN

The college offers a Bachelor of Science program designed to prepare students to become professional nurses for practice in a variety of health-care settings, such as hospitals, neighborhood health centers, schools, and homes. The College of Nursing aims to provide all students—including those with diverse backgrounds and changing career goals—with a broadly based education and the stimulus for ongoing personal and professional growth.

The curriculum offers instruction in nursing theory and research, the humanities, and the sciences. More than 50 percent of the coursework is in the sciences and humanities.

In addition to completing academic coursework, students must meet the cooperative education requirement, which gives students the opportunity to integrate the theory and practice of nursing in selected settings. Through thirty health-care agencies in Greater Boston, including community and institutional settings, students gain experience in providing nursing care to clients and families.

As primary health-care providers, nurses engage in a range of activities promoting and teaching health and coordinating care in every sector of the health-care system. Nurses have major roles in wellness and health promotion, acute care, long-term care for the chronically ill, and community health care.

The baccalaureate nursing program provides the educational background needed for graduate study in nursing specialties. Successful completion of the baccalaureate program allows its graduates to take the National Council Licensing Examination (NCLEX-RN) to become registered nurses.

The program is accredited by the National League for Nursing and approved by the Board of Registration in Nursing of the Commonwealth of Massachusetts. Accreditation and approval indicate that the program meets educational standards for faculty, curriculum design, student quality, and overall University support. The college subscribes to the standards established by the American Association of Colleges of Nursing, of which it is a member.

Class Entrance Requirements

The requirements listed are for the Class of 1995 and beyond. Students completing the nursing program prior to 1995 are strongly encouraged to meet these academic standards. The minimum overall quality-point averages (QPA) listed are required at year's end for students to advance to the next level or to graduate.

Sophomore	1.6
Middler	1.8
Junior	2.0
Senior	2.0
To graduate	2.0

These averages reflect the minimum requirements for advancement; the faculty of the college highly recommends that students achieve higher grades in order to avoid academic difficulties as they progress through the program.

In addition, a grade of 2.0 or better is required in each nursing course. During the first year, nursing students must achieve a grade of C or better in BIO 1152 and BIO 1153. The QPA for these science courses must be 1.8 before a student can enter the sophomore year. Other standards for progress, such as the minimum science QPA for the sophomore year, are published in the *College of Nursing Undergraduate Student Handbook* available at 211 Robinson Hall.

Special Requirements

Prior to entering, every student must have a physical examination, including a rubella titre and immunization for measles, mumps, rubella, and tetanus. Hepatitis B and a chicken pox titre are required prior to clinical experience. Each year thereafter, the student must receive a health clearance. All students must carry malpractice insurance. Arrangements for this insurance are made by the University. Students in the College of Nursing are required to wear the approved school uniform in clinical laboratory areas during academic quarters. A modification of the uniform is worn during cooperative education work experiences. All students assigned to a clinical nursing course must be certified in cardiopulmonary resuscitation (CPR); annual recertification is required. Students enrolled in the Community Health Nursing course must have access to a car to travel to assigned agencies.

Graduation Requirements

The College of Nursing reserves the right to amend courses, the program, and degree requirements to fulfill its responsibility as a professional program leading to licensure. The faculty has designed a curriculum to prepare nursing students for a reformed health care system. The new curriculum will be phased in beginning with the freshman and sophomore classes in the 1994–1995 academic year. Students entering the program in Fall 1994 must anticipate some changes in the courses to be offered and the program requirements from those printed in this undergraduate catalog. Degree candidates must complete all prescribed courses, a minimum of 177 quarter hours of credit. An overall science and nursing QPA of 2.0, with a C in all nursing courses and specified minimal grades as set forth in the policies of the college are required. Degree requirements are based upon the year of graduation, determined by the date of entry or re-entry into the College of Nursing. Degree requirements and the year of graduation for a student who does not make normal academic progress for more than two quarters will be subject to review and possible change. Candidates must meet the requirements of the Department of Cooperative Education and University residency requirements.

Transfer Student Track

The College of Nursing welcomes transfer students and students planning a career change who have a degree in another field, or who have completed a minimum of 45 quarter hours or transfer credits that are appropriate to curriculum requirements; these credits must include two anatomy and physiology courses and reflect a minimum overall QPA of 2.5. Students are accepted into this track for the fall quarter only. Once accepted, the transfer student follows a fixed curriculum plan that includes a minimum of three quarters of cooperative education experience. Students may complete baccalaureate program requirements in approximately two years and nine months.

RN to BSN Option

The college accepts registered nurses who wish to complete requirements for a Bachelor of Science in Nursing degree for either a full-time College of Nursing day option or the part-time University College evening section. The length of the program varies, depending on the individual's previous educational experience and ability to achieve advanced placement through selected methods. The program accepts either the Act Proficiency Examination Program (ACT PEP) or the National League for Nursing Mobility Profile II Examination for advanced placement.

Bachelor of Science Curriculum

Quarter 1	BIO 1115, Introduction to Human Biology; ENG 1110, Freshman English 1; MTH 1106, Fundamentals of Mathematics; and NUR 1100, Introduction to Professional Nursing and the Health System.
Quarter 2	BIO 1152, Integrated Anatomy and Physiology 1; CHM 1111, General Chemistry 1; ENG 1111, Freshman English 2; and NUR 1101, Introduction to the Theoretical Basis for Nursing Practice.
Quarter 3	BIO 1153, Integrated Anatomy and Physiology 2; CHM 1112, General Chemistry 2; NUR 1102, Introduction to Human Nutrition; and SOC 1100, Introduction to Sociology.
Quarter 4	BIO 1120, Basic Microbiology; BIO 1154, Integrated Anatomy and Physiology 3; NUR 1200, Nursing Basic Human Needs 1; and PSY 1111, Foundations of Psychology 1.
Quarter 5	NUR 1201, Nursing Basic Human Needs 2; NUR 1202, Introduction to Pathophysiological Concepts for Clinical Nursing; PSY 1112, Foundations of Psychology 2; and one computer elective.

Quarter 6	NUR 1300, Nursing Common Problems; NUR 1302, Transition (RN only); PCL 1305, Pharmacodynamics; PSY 1241, Human Behavioral Development 1; and SOA 1100, Peoples and Cultures.
Quarter 7	ENG 1350, Intermediate Writing; NUR 1301, Psychiatric/Mental Health Nursing; and PSY 1242, Human Behavioral Development 2.
Quarter 8	NUR 1401, Medical-Surgical Nursing; one humanities elective; and one open elective.
Quarter 9	NUR 1400, Maternal and Child Nursing; one humanities elective; and one history elective.
Quarter 10	NUR 1500, Community Health Nursing and two open electives.
Quarter 11	NUR 1502, Introduction to Research in Nursing; NUR 1504, Contemporary Issues in Nursing; NUR 1505, Introduction to Leadership and Management of Patient Care; and one open elective (optional).

Electives

The College of Nursing offers electives that enable students to satisfy their personal objectives. They include Advanced Clinical Care; Health Assessment; Independent Study; The Nurse Entrepreneur; International Health Care Practices; International Health Care Delivery; International Health Policy Issues; and Women's Health Choices and Decisions.

Alternative Freshman-Year Program

The Alternative Freshman-Year (AFY) Program is designed for students who need help in strengthening their basic study skills and abilities while they take the required freshman-year coursework in English, mathematics, and social sciences.

The program carefully monitors student participation in small, homogenous classes that are based on supportive group-learning procedures. The program also provides participants with extensive help in clarifying their academic and career goals.

Through the combination of a carefully prescribed curriculum and the attention of faculty whose expertise is in developmental education, students follow a program that fits their individual needs. These same faculty teach the majority of the courses taken by AFY students, provide advice and support, and participate in a "House Plan" in which faculty members share information on each student's progress.

The program's flexibility not only helps AFY students gain confidence in their ability to do college-level work, but also allows them to consider several different areas of study before selecting a major. Students in this program are considered regular degree candidates with an undeclared major and enter their desired majors as sophomores.

In preparation for gaining sophomore status, AFY students follow one of three curriculum tracks: business, nonbusiness (including undecided) and health/science. With the exception of the health/science track, students may change either their intended major or curriculum track through the winter quarter of the freshman year without falling behind.

Students in the program have access to all physical education facilities and extracurricular programs. Alternative freshman-year students are encouraged to make extensive use of the Academic Assistance Center and the math and writing centers. Students are frequently referred to the Learning Resources Center. The Counseling Center is available for personal and academic counseling as well as for vocational testing and counseling.

Class Entrance Requirements

To qualify for sophomore status in the College of Arts and Sciences, the College of Business Administration, and the College of Criminal Justice, AFY students must earn a quality-point average of 1.4 or higher and successfully complete forty-four programmed credits, as well as required courses. The College of Business Administration requires students to earn a 1.8 in the four core courses: ECS 4601, ENG 4014, MGT 4110, and MTH 1113.

Alternative freshman-year students may also qualify, on a space-available basis, for all majors in the Bouvé College of Pharmacy and Health Sciences with the exception of Physical Therapy, by following the AFY health/science curriculum track. Such students must complete fifty-nine programmed credits over four quarters, including three chemistry, two biology and two advanced math courses with a QPA of 3.0 or higher, with no grade below C in the science courses. Repeaters in the Alternative freshman-year program are not eligible for any majors in the Bouvé College.

AFY students who do not meet the requirements for sophomore status in their intended majors are classified as "repeaters" until they meet quality-point average and credit requirements for completing the freshman year in their particular program.

Tuition and Fees

Tuition and fees for the Alternative Freshman-Year Program are the same as for students in the full-time day programs. Payment of the standard tuition for the first three academic quarters entitles students to forty-eight credit hours of instruction. Thus, those who take the forty-four programmed credits are entitled to a four-quarter-hour tuition adjustment at the regular freshman rate.

Students following the health/science curriculum track are required to attend four consecutive quarters before qualifying for sophomore standing. However, such students incur no tuition charges for the fourth quarter of study, and thus have the same tuition costs as those in the business and nonbusiness tracks.

Business Track	Quarter 1	ED 4003, Integrated Language Skills Development A; ENG 4013, Fundamentals of English 1; HST 4110, History of Civilization A <i>or</i> ECN 4601, Economics 1; and MTH 1000, Math Preliminaries 1.
	Quarter 2	ED 4004, Integrated Language Skills Development B; ENG 4014, Fundamentals of English 2; HST 4110, History of Civilization A <i>or</i> MGT 4110, Survey of Business and Management; and MTH 1010, Math Preliminaries 2.
	Quarter 3	ECN 4601, Economics 1 <i>or</i> 2; MGT 4110, Survey of Business and Management; HST 4111, History of Civilization B; MTH 1113, Math for Business; and a directed elective.
Arts and Sciences, Criminal Justice, or Education Track	Quarter 1	ED 4003, Integrated Language Skills Development A; ENG 4013, Fundamentals of English 1; MTH 1000, Math Preliminaries 1; and SOC 4010, Principles of Sociology 1 <i>or</i> HST 4110, History of Civilization A.
	Quarter 2	ED 4004, Integrated Language Skills Development B; ENG 4014, Fundamentals of English 2; HST 4110, History of Civilization A; and MTH 1010, Math Preliminaries 2 <i>or</i> SOC 4011, Principles of Sociology 2.
	Quarter 3	ENG 1111, Freshman English 2 <i>or</i> a directed elective; HST 4111, History of Civilization B; POL 4106, Introduction to Politics, an elective; and SOC 4011, Principles of Sociology 2; <i>or</i> an elective.
Health Sciences Track	Quarter 1	CHM 1110, General Chemistry Preliminaries; ED 4001, Integrated Language Skills Development 1; ENG 4013, Fundamentals of English 1; and MTH 1010, Math Preliminaries 2.
	Quarter 2	CHM 1111, General Chemistry 1; ED 4002, Integrated Language Skills Development 2; ENG 4014, Fundamentals of English 2; and MTH 1106, Fundamentals of Mathematics.
	Quarter 3	BIO 1140, Basic Animal Biology 1; CHM 1112, General Chemistry 2 <i>or</i> CHM 1122, General Chemistry 2A; ENG 1111, Freshman English 2 <i>or</i> a directed elective; and a directed elective.
	Quarter 4	BIO 1141, Basic Animal Biology 2; MTH 1107, Functions and Basic Calculus; and a directed elective.

In each curriculum, students will be placed into one of three mathematics courses based on testing results.

Course Descriptions

Arts and Sciences

Please note some courses in the College of Arts and Sciences are duplicated in different departments or colleges, or within a department. You may not receive credit for two such courses. If you have a question about whether one course does overlap with another, please consult the departments involved and the Office of the Dean before taking the course.

Numbers in parentheses within course descriptions refer to core curriculum categories listed on page 31.

African-American Studies

AFR 1100 Introduction to African-American Studies 4 QH

Explores several of the possible historical, sociological, cultural, and political avenues of study in the broad interdisciplinary spectrum of African-American studies. Provides an introductory overview of the field and will offer an opportunity to identify areas for more specific focus.

AFR 1131 African-American History 1 4 QH

Covers the development of black America from the period of slavery through Reconstruction, with emphasis on the historical links between Africa and America and the impact on black development in the United States. Same as HST 1525. (III)

AFR 1132 African-American History 2 4 QH

Examines the development of black America from Reconstruction to the present, and the effects of events in the United States and world history on the development of black America. Emphasizes contemporary issues and how these issues can be seen through a historical perspective. Same as HST 1526. *Prereq.* AFR 1131 or permission of instructor.

AFR 1133 History of Blacks in the Media and the Press 4 QH

Offers a historical and visual examination of the development of the African-American experience in the American mass media and press. Analyzes contemporary and historical literature, films, and people with respect to history, racism, images, psychology, and social movements. Newspapers, film, television, and radio are prime focal points, and are used to help form strategies for the future of black Americans.

AFR 1141 Education Issues and Minority Communities 1 4 QH

Focuses on some of the important issues in today's urban elementary and secondary education systems. The analysis will look at the historical development of these issues, and students will be encouraged to think about and discuss the issues' future significance.

AFR 1151 Survey of African-American Art 4 QH

Offers a historical and critical examination of African-American art from the nineteenth century to the present, with special emphasis on the effects of European and African art styles on the black artist in America. Same as ART 1218.

AFR 1153 Survey of African-American Music 4 QH

Studies the impact of African rhythm on black music, the New Orleans coalescence, regional development, ragtime, the emergence of large bands, the harmonic revolution of the forties,

bebop, the 1960s avant-garde, and subsequent developments. Some analysis of specific jazz phenomena is included. Same as MUS 1104.

AFR 1155 Foundations of Black Culture 4 QH

Studies music, literature, visual and performing arts, and other cultural and artistic traditions as they have evolved among African, African-American, and Caribbean peoples.

AFR 1156 Music of Africa 4 QH

Provides a broad survey of the musical traditions of Africa with respect to their historical, social, and cultural backgrounds. Musical organization, musical practice, and aspects of style will all be discussed in light of possible contributions to contemporary African-American music. Same as MUS 1181.

AFR 1161 Economic Issues in Minority Communities 4 QH

Examines minority life-styles, perspectives, self-images and social position in the urban community, particularly in terms of the application of basic economic theories to the economic realities of minority communities. Same as ECN 1170. (VI)

AFR 1171 Contemporary Black Politics 4 QH

Analyzes the evolution of black political thought in America and examines the socio-political contests that have served as catalysts to modern black political movements.

AFR 1191 Early African Civilization 4 QH

Studies the ancient empires of Africa, especially Ghana, Songhai, Mali, Zimbabwe, the city states of East Africa, Nubia, Egypt, Ethiopia, and the Congo Kingdom. Same as HST 1620.

AFR 1193 Africa Today 4 QH

Studies the complex political and social picture of Africa. This course examines some of the salient features of black art, politics, and identity in Africa.

AFR 1195 Identity and Nationalism in Africa 4 QH

Studies how centuries of imperialism, the struggle for national unity, and the continuing problems of racism and rivalry between factions have affected the present identities and nationalist movements in Africa. This course explores problems peculiar to Africa and to any group of nations struggling against colonial ideas. Tribalism and the effects of European colonial partition on African identity are discussed.

AFR 1196 The Black Experience in the Caribbean 4 QH

Offers a descriptive and interpretive analysis of the growth of the modern black community in the Caribbean. Although the focus will be on the contemporary period, the course will examine that period in the context of colonialism and slavery in the Americas. Important racial, social, political, economic, and religious issues will be addressed.

AFR 1197 Modern African Civilization 4 QH

Explores African history and culture from 1800 to the present era. Emphasis will be placed on the relationship between Europe and Africa, the circumstances surrounding the imperialist partition of Africa, and the decolonization process. This course is the same as HST 1621. (IV)

AFR 1211 African-Americans in Science, Technology, and Medicine 4 QH

Studies the contributions that African-Americans have made to the development of science and technology in America. It examines the cultural and social factors that have encouraged blacks to work in the fields of science (biology, chemistry, physics) and technology (engineering and medicine). Certification of blacks within the American scientific community and the availability of science to the past and contemporary African-American communities are also explored. Readings, discussions, individual research topics, and interviews with black scientists, inventors/engineers, and doctors are used to develop the basic course material.

AFR 1220 The Black Novel 4 QH

Focuses on the black novelist's place in the history of American fiction. Special attention is given to Chesnutt, Toomer, Wright, Ellison, and contemporary novelists, and to their different perceptions of the black experience in America.

AFR 1231 African-American English 4 QH

Addresses topics in the study of African-American English. Investigates the hypotheses about the origins of African-American English as well as arguments about the relation of the dialect to English and other languages. Considers issues regarding the use of the dialect in the educational context.

AFR 1235 Black History of Boston 4 QH

Examines the social, economic, political, and educational history of Boston's black community in the nineteenth and twentieth centuries. The development of the black community and its institutions is a major focus, and students are encouraged to study the past in an attempt to understand the present and interpret the future. Research data include participant observation, oral history, interviews, and primary and secondary source materials.

AFR 1240 Contemporary Issues in Black Society 4 QH

Introduces the various issues and problems that confront black Americans, including some of the realities of the social, political, and economic problems of contemporary black experience. Students are asked to assess the validity of specific social theories in relation to the black experience.

AFR 1241 The Black Family 4 QH

Studies how the black family functions, both interpersonally and as a social unit. Anthropological and sociological theories deal with variations in family structure and the function of the black family in black society. The effects of slavery and colonization on the black family structure and functions are also explored. A side issue is a discussion of some of the differences and similarities between African, African-American, and African-Caribbean families.

AFR 1248 Race Relations in America 4 QH

Examines the interrelations of ethnic, cultural, and minority groups in the United States. Focus is on the nature of racial conflicts, discrimination, reverse discrimination, personal and institutional racism, and racial and ethnic stereotyping. Discussion considers avenues of improvement in attitude awareness and change.

AFR 1249 Black Community and Social Change 4 QH

Explores the dynamic changes experienced by black communities in the United States since the Civil Rights era in the 1950s and 1960s. Includes discussions and applications of key concepts and methods in several fields of the social sciences, and seeks to understand the relationship of race, class, gender, and social

change in addressing the current search for policies and programs for community development.

AFR 1251 Survey of Black Theater and Drama 4 QH

Focuses on the development of black drama during the nineteenth and twentieth centuries, with emphasis on modern developments and their political and cultural significance. Same as THE 1118.

AFR 1261 The Economics of Urban Poverty 4 QH

Focuses on the migration of blacks to central cities in America. Unlike other migrants to urban centers, blacks were not assimilated into the social/economic mainstream, and there is evidence of flagrant job, housing, and educational discrimination against them even during periods of affluence. During recession or depression, their problems were compounded. Students have the opportunity to survey the above events from an economic framework.

AFR 1280 Black Psychological Identity 4 QH

Provides an interdisciplinary look at the social, political, and psychological factors shaping contemporary African-American identity. Explores several different factors that interact with blackness to shape the diversity of African-American experience, such as skin color, gender, culture, and class. Studies black identity as it has been conceptualized, measured, and researched by psychologists. Readings include essays written by important African-American thinkers, fiction and autobiographical narratives, as well as empirical research in the field of psychology. This course is the same as PSY 1280.

AFR 1294 Third World Political Relations 4 QH

Offers a comparative regional analysis of the political systems of third world nations of Africa, Asia, Latin America, and the Caribbean. Emphasis is on development strategies; problems of development, including national identity, political socialization and participation, national defense, and urbanization; and the positions of third world nations in the international community.

AFR 1295 Politics of South Africa 4 QH

Examines contemporary political developments in South Africa. Focuses on the historical development of the system of racism called apartheid and the liberation movements, and the struggle for a democratic South Africa. Explores the role of the United Nations, the Organization of African Unity, the United States, and other international organizations and countries.

AFR 1297 Caribbean History 4 QH

Analyzes the development of the Caribbean from slavery to the present. The focus will be on the period 1918-1962 especially, and emphasis will be on the historical analysis of the relationship of the Caribbean with the United States and black Americans. Same as HST 1605.

AFR 1300, AFR 1301, AFR 1310, AFR 1311 Directed Study 4 QH each

Offers the ambitious student the opportunity to pursue a special intellectual interest not covered by the department course offerings and to work on this interest with the department faculty member of his/her choice. The faculty member will closely supervise the project and act as adviser for the duration of the quarter.

AFR 1342 Crisis and Conflict in Black Africa 4 QH

Explores contemporary politics in African nations south of the Sahara using films, maps, news clips, discussions, and readings. Studies South Africa, Nigeria, Kenya, and Ethiopia. Examines

apartheid, colonialism, Afro-Marxism, chieftaincy, economic development, and Pan-Africanism. Same as POL 1342. (VI)

AFR 1350 Research Seminar 4 QH
Provides students the opportunity, first, to identify a substantive area of their concern (for example, welfare, political leadership, education) and to define a related problem in a research context; second, to be supervised in designing a research methodology most appropriate for examining the problem area; and third, to conduct extensive research, test the hypothesis, and draw conclusions based on data analysis techniques.

AFR 1355 Directed Study for Senior Thesis 4 QH
Offers students the opportunity to prepare a professional research paper under the close supervision of a scholar interested in students' particular research areas. The senior thesis is required of all African-American Studies majors. *Prereq. Permission of instructor.*

AFR 1380 Junior/Senior Honors Program 4 QH
For details contact the honors office.

AFR 1401 History of East Africa 4 QH
Deals with the precolonial period and the problems of the partition of Africa in the first section of the course. The second section focuses on the classical colonial period and the transformations of colonial policy after World War II, with particular emphasis on the ambiguity of decolonization and those features of the colonial system that seem to have become a part of the East African social and political environment.

AFR 1403 History of West Africa 4 QH
Studies the history of West Africa and its struggle for internal unity, economic development, and social justice. The Pan-Africanist ideology, W.E.B. DuBois's writings, African socialism, and the consolidation of power and leadership are some of the topical objectives in this study of African liberation, particularly the rise of West Africa. Same as HST 1623.

AFR 1405 History of South Africa 4 QH
Studies pre-colonial South Africa and the conflict between Africans and the Dutch and English settlers. The course then focuses on the formation and transformation of colonial policy after World War II, with particular emphasis on racism, neo-colonialism, liberation movements, and international involvement in the apartheid system. Same as HST 1625. (VI) *Prereq. AFR 1491 or permission of instructor.*

AFR 1415 African Language 4 QH
Seeks to prepare students for serious theoretical and practical study of the West African language and literature known as Kwa, the largest language subgroup in the Niger-Congo family. Students will explore the classification of African languages, the application of basic linguistics, and the history of these languages in Africa and the Western hemisphere, all leading to an introduction to spoken Yoruba and Igbo.

AFR 1421 African-American Literature 2 4 QH
Continues AFR 1127. Focuses on principal writers and their major themes. *Prereq. AFR 1127 or permission of instructor.*

AFR 1448 Religion in Black American Society 4 QH
Examines the impact of religion on social structures, group behaviors, moral codes, and belief patterns in black society. Topics include the church as a social organizer, the role of the

black minister in the community, and the variety of black denominations in urban and rural areas.

AFR 1451 Seminar: Creative Expression in Blues and Jazz 4 QH
Explores African sources of inspiration for the musical literature of blues and jazz. Focuses on blues and jazz as a reflection of African-American life and on the impact these musical forms have had on black self-image and position in American culture.

AFR 1470 Black Political Thought 4 QH
Examines black opinions, from the radical to the ultra-conservative, of the United States political system. The focus is historical in context and will address notions of political socialization and the development of black political ideologies.

AFR 1500 Topics in African-American Studies 4 QH
Examines closely topics of interest to students of African-American Studies, including political leadership, intellectual history, cultural and artistic expression, community development, and recent social and economic trends.

AFR 1810, 1811, 1812, 1813 Junior/Senior Honors Project 4 QH each
For details contact the honors office.

The following courses may be of interest to the student wishing to concentrate in African-American Studies. Descriptions for these courses may be found in the appropriate department listing.

PHL 1100 Introduction to Philosophy

PHL 1140 Social and Political Philosophy

PHL 1243 Existentialism

PHL 1335 Moral Philosophy

POL 1303 Political Behavior

POL 1362 Civil Liberties

POL 1386 International Law

SOA 1345 People in Cities

SOC 1147 Urban Social Problems

SOC 1170 Race and Ethnic Relations

SOC 1310 Class, Power, and Social Change

American Sign Language—English Interpreting

ASL 1101 American Sign Language 1 4 QH
Introduces American Sign Language and deaf culture, focusing on frequently used signs, basic rules of grammar, nonmanual aspects of ASL, introductory fingerspelling, and some cultural features of the Deaf community.

ASL 1102 American Sign Language 2 4 QH
Continues basic language and culture study. Offers an opportunity to build receptive and expressive ASL vocabulary. Topics include the use of signing space; and further use of nonmanual compo-

nents, including facial expression and body postures. *Prereq.* ASL 1101, or permission of instructor.

ASL 1201 Intermediate American Sign Language 1 4 QH
Emphasizes further development of receptive and expressive skills, fingerspelling, vocabulary building, grammatical structures; encourages more extensive use of non-manual behaviors, classifiers, body postures, and signing space. Introduction to regional and ethnic sign variations and political and educational institutions of the Deaf community. *Prereq.* ASL 1102, or permission of instructor.

ASL 1202 Intermediate American Sign Language 2 4 QH
Offers intensive practice involving expressive and receptive skills in story telling and dialogue. Introduces language forms used in ASL poetry and the features of culture as they are displayed in art and the theatre. *Prereq.* ASL 1201, or permission of instructor.

ASL 1211 Deaf Culture 4 QH
Focuses on the status of Deaf people as a linguistic and cultural minority group. Topics include the role of American Sign Language in the Deaf community; educational and historical perspectives on deafness; and sociological and cultural make-up of the Deaf community. *Prereq.* ASL 1201, or permission of instructor.

ASL 1212 Deaf History 4 QH
Surveys the history of Deaf people in the Western world, with emphasis on the American Deaf community, their language, education, and relationship to hearing society. *Prereq.* ASL 1101, or permission of instructor.

ASL 1250 Linguistics of American Sign Language 4 QH
Introduces the basic issues in linguistics by examining the structural properties of American Sign Language and comparing it with other languages having similar properties. Includes phonology (formational properties of signs), morphology (word formation rules, derivation, and inflection, complex verbs, classifiers, verb modulations), semantics (the meaning structure of signs), and syntax (the structure of ASL utterances in terms of old versus new information and the structure of ASL narratives). *Prereq.* ENG 1118, and the ability to follow lectures in ASL.

ASL 1301 Advanced American Sign Language Proficiency 4 QH
Emphasizes vocabulary building and mastery of fine points of grammar through rigorous receptive and expressive language activities. Explores a variety of signing styles and registers. Includes student-led discussions, debates, and reports on topics in Deaf culture, society, and current affairs. *Prereq.* ASL 1202, or permission of instructor.

ASL 1302 Advanced American Sign Language Proficiency 2 4 QH
Continues ASL 1301. *Prereq.* ASL 1301 or permission of instructor.

ASL 1401 American Sign Language Literature 4 QH
Examines and discusses various genres of American Sign Language. This course will concentrate on the work of current, recognized narrators in both literary and face-to-face storytelling traditions, and will also include selected autobiographical sketches, lectures, stories, and letters from the early 1900s by such historical figures as Clerc, Veditz, E.M. Gallaudet, Hotchkiss, and others. A videotaped research essay in ASL will be required at the end of the course. *Prereq.* ASL 1202 or permission of instructor.

ASL 1500 Introduction to Interpreting 4 QH
Presents an overview of the interpreting profession: responsibilities, ethics, and aptitudes of interpreters; professional associations; law and business of interpreting; the bilingual and bicultural context; basic translation and interpretation; environment and audience; special populations; freelance versus in-house positions; and evaluation and certification. *Prereq. or concurrent:* ASL 1211 and ASL 1301. *Majors only or permission of instructor.*

ASL 1505 ASL–English Interpreting 1 4 QH
Presents an overview of theoretical models. Examines the processes of translating and interpreting through practice of requisite skills and process tasks, and by applying skills and theory. *Prereq.* ASL 1302 with a grade of B or better and ASL 1500. *Majors only or permission of instructor.*

ASL 1506 ASL–English Interpreting 2 4 QH
Continues the study of interpreting, including practice of requisite skills and process tasks of increased complexity. Focuses on consecutive interpreting by applying process skills, contrasting ASL–English linguistics, and contrasting cultural analysis. *Prereq.* ASL 1505 with a grade of B or better. *Majors only or permission of instructor.*

ASL 1507 ASL–English Interpreting 3 4 QH
Continues the study of interpreting, including practice of requisite skills and process tasks of increased complexity. Focuses on simultaneous interpreting through applying process skills, contrasting group dynamics, and analyzing discourse. *Prereq.* ASL 1506 with a grade of B or better. *Majors only or permission of instructor.*

ASL 1520 Interpreter Role and Ethics 4 QH
Explores ethical standards and dilemmas in ASL–English interpreting and other professions through discussions, hypothetical situations, and role playing. Includes topics such as culturally objective standards, ethics and professional principles, power relations within groups, and the Registry of Interpreters for the Deaf code of ethics. *Prereq.* ASL 1500. *Majors only or permission of instructor.*

ASL 1521 Contrastive Analysis 4 QH
Examines and contrasts the major linguistic features of ASL and English. The standard division of morphology, phonology, syntax, semantics, and register is reintroduced, and the various elements of both languages that fall under these divisions are compared point by point. *Prereq.* ASL 1522 or permission of instructor.

ASL 1522 Discourse Analysis for Interpreters 4 QH
Presumes that the sentence is not the largest linguistic unit in all languages, including ASL, and that linguistic structures do not exist in isolation, but rather join together in a communicative process. Explores how discourse, such as conversations and texts, is structured, and emphasizes the discourse strategies of ASL. *Prereq.* ASL 1250 or ASL 1302 or permission of instructor.

ASL 1801, ASL 1802, ASL 1803, ASL 1804, ASL 1805 4 QH each
Directed Study
Offers students an opportunity to go beyond course work of the regular curriculum or to pursue an individual learning project. May include research, practicum, or language development activity.

ASL 1810 Special Topics in Interpreting 4 QH
Provides students with an overview of interpreting for populations with particular needs and preferences as well as interpreting in settings where specific knowledge bases are required. Populations

settings will rotate and may include elderly, children, and foreign Deaf adults, as well as deaf-blind, multihandicapped, visual-gestural, educational, high-tech, and performing arts settings. *Prereq.* ASL 1506. *Majors only or permission of instructor. May be taken twice for credit.*

ASL 1820 Interpreting Practicum 4 QH
Features practical interpreting experience in agencies serving Deaf people. Focuses on linguistic and ethical questions and dilemmas in a biweekly seminar format. Requires six hours per week in an agency. *Prereq.* ASL 1507 and ASL 1520, both with a grade of B or better. *Majors only or permission of instructor. May be taken twice for credit.*

Anthropology

SOA 1100 Peoples and Cultures 4 QH
Surveys concepts in anthropology (the study of culture). Analyzes a range of societies in terms of such sociocultural institutions as kinship, gender relations, economics, politics, and religion. Examines important political and economic processes, such as colonialism and development, affecting cultures around the world.

SOA 1101 Cultural Meaning and Everyday Life 4 QH
Studies the underlying patterns of meaning that are below the surface of everyday thought and behavior. Examines daily routines, leisure activities, joking and humor, speech patterns, popular culture, current folklore and mythology, nonmonetary economic transactions, kinship and friendship, and religion and ritual.

SOA 1104 Cultures of the World 4 QH
Explores cultural differences among peoples in societies around the globe and analyzes how diverse cultural patterns can be studied and described. (II)

SOA 1120 Camera on Culture: Visual Anthropology 4 QH
Explores how cultures are portrayed on film. Examines anthropologists' use of film to gather information and represent other peoples. Also examines how filmmakers from postcolonial societies have addressed the respective cultures, the experience of colonialism, and the nature of film-making and film/video consumption in the third world. When possible, a production experience is included. (IV)

SOA 1125 Stones and Bones: Prehistory in the New World 4 QH
Surveys the New World prehistoric cultures. Focuses on examining the work of archaeology and ethnohistory in a range of societies in both South and North America. Pays particular attention to social, political, and economic factors and how these work to promote such things as state formation, regional political alignment, and social differentiation. Studies the Incan, Mayan, and Aztec states, as well as the big game hunting traditions of the Plains, the forming communities of the Southwestern United States and Mississippi River area.

SOA 1146 Rural Workers in the Third World 4 QH
Surveys the lives of rural peoples in the contemporary Third World. Focuses on people's organizing efforts to improve their living and working conditions. Uses case studies from Latin America and China. (IV)

SOA 1155 Individual and Culture 4 QH
Explores the ways in which individuals are shaped by society and the ways in which they can effect change.

SOA 1160 Sex, Sex Roles, and Family 4 QH
Examines popular and scientific notions about sex, gender relations, family, and kinship. Examines why our images of family, masculinity, and femininity are not universal by analyzing the patterns of sex roles, sexual practices, and kinship in other cultures. Discusses how and why relations between men and women change during times of socioeconomic and political change.

SOA 1185 War and Aggression 4 QH
Evaluates, by using anthropological investigations, the assumption that aggression is part of human nature and linked to sex differences. Discusses cross-cultural variation in violent behavior and warfare in the context of wider political and economic processes. Analyzes the widespread belief in innate masculine aggression as it relates to contemporary societal violence and militarism.

SOA 1220 Culture and Mental Illness 4 QH
Discusses and analyzes the nature and meaning of culture, the role of culture in personality formation, culture and anxiety, anthropological approaches to the "normal" and the "abnormal," and the question, "Is mental illness psychological fact or cultural fiction?"

SOA 1275 Musical Culture: Notes in the Modern World 4 QH
Explores issues of class, ethnicity, gender, sexuality, and age in the cross-cultural context of music as expressed in performances, recordings, videos, literary, and ethnographic materials. The course will also examine the social production and consumption of music. Expects students to conduct a series of field exercises.

SOA 1301 Human Origins 4 QH
Offers an intensive look at the data on fossil remains and contemporary primates, which are essential for an understanding of human physical and behavioral evolution. Efforts are made to bring the student into direct contact with primary materials. (II)

SOA 1303 Sexuality and Culture 4 QH
Examines sexuality in a cross-cultural perspective including issues of sexual identity, the relationship of sexuality to the life cycle, sexual ideologies, and the links between sexuality and the reproduction of cultural norms. Topics include cross-cultural variation in sexual expression, sex and reproduction as commodities, sexuality and violence, sexually transmitted diseases and social policy. Compares sexuality issues in the United States to those of other cultures.

SOA 1310 Global Markets and Local Cultures 4 QH
Discusses selected topics in the socioeconomic transformation of other cultures, including urbanization, industrialization, commodity production, and international labor migration. Focuses on the impact of capitalist development on contemporary third world and postcolonial societies; examines local responses to those changes.

SOA 1320 Anthropology Methods 4 QH
Examines theory and practice of methods of field research and data analysis. Gives students the opportunity to take part in a field project.

SOA 1335 Language and Culture 4 QH
Focuses on the anthropological study of linguistics. Presents basic theories of sociolinguistics and explores language in its social context. Includes animal communication; language learning;

language and mind; cognitive and symbolic anthropology; the ethnography of speaking, speech, and boundaries; multilingualism; language and gender; language and ethnicity; language and social class; and pidgins and Creoles. Includes several field assignments.

SOA 1345 People in Cities 4 QH

Studies urban life and urban problems, using international case studies. Addresses rural/urban and international migration, the relationship of urban settlement to employment patterns, the creation of inner-city or suburban ghettos or squatter settlements, and movements for city services in areas of spontaneous growth. Gives students the chance to design and implement a field project.

SOA 1425 Cultural Survival 4 QH

Examines the problems faced by today's tribal peoples and national minorities. Using cross-cultural case studies, analyzes the relationship of governmental policies and economic development priorities to the survival of self-identified tribal cultures and minority populations throughout the world. Examines human rights, nationalism, and cultural autonomy, resistance, and self-determination.

SOA 1430 Latin American Society and Development 4 QH

Explores the processes of social, economic, and cultural change in Latin America. While concentrating on the present, traces class formation, agrarian structures, ethnic identity, ceremonial organization, gender roles, and political conflict since the colonial era in a range of countries. Emphasizes the relationship of communities and national political and economic systems. May emphasize Central America and Mexico or countries in South America through case studies. (IV)

SOA 1431 Native North Americans 4 QH

Explores North American Indian tribes including the Dakota (Sioux), Navajo, Pueblo, Mohawk, and Penobscot, and examines the historical changes that led to their contemporary situation. Focuses on the reservation and its many problems from various viewpoints.

SOA 1470 Religion and Myth 4 QH

Focuses on nature and institutionalization of primitive, ancient, and contemporary religions. Explores religious concepts and movements in relation to social, religious, and political organization.

SOA 1704 Cultures of the World (Honors) 4 QH

Honors equivalent of SOA 1104.

SOA 1800, SOA 1801 Directed Study 4 QH each

Offers independent work on a chosen topic under the direction of members of the department. *Prereq.* Senior standing and department approval.

SOA 1820, SOA 1821, SOA 1822, SOA 1823 4 QH each

Junior/Senior Honors Project

For details contact the honors office.

SOA 3100 Theory 4 QH

Graduate school course open to qualified undergraduates with permission of instructor.

Art and Architecture

ART 1100 History of Art to 1400 4 QH

Provides a survey of Western art from prehistoric times to the Renaissance.

ART 1101 History of Art Since 1400 4 QH

Surveys Western art from the Renaissance to the twentieth century.

ART 1106 Introduction to Art 4 QH

Offers an introduction to the characteristics of the visual arts, including painting, sculpture, graphic arts, and architecture. Studies various examples of works of art as an introduction to style and technique. Includes visits to museum collections and contemporary art galleries. (II)

ART 1111 Introduction to Architecture 4 QH

Introduces the history, theory, and practice of architecture. Shows how architects in different historical periods have balanced the demands of function, construction and aesthetics. Concentrates on specific design problems found in churches, houses, skyscrapers, and cities.

ART 1124 Basic Drawing 4 QH

Offers intensive drawing instruction. Focuses on developing a formal understanding of the structure of objects and figures as well as increased dexterity with a variety of drawing tools. Includes experiments with materials such as wash, charcoal, and pencil.

ART 1127 Basic Painting 4 QH

Presents an introductory studio course in the fundamental techniques of painting. Formal problems in the study of color, light, space systems, form, and composition establish the foundation for more individual creative expression. Uses critiques and slide lectures as needed.

ART 1130 Visual Studies Foundation 1 4 QH

Offers an introductory lecture/studio course clarifying basic principles, language, and concepts inherent in visual language systems. Concentrates on two-dimensional media including photography, painting, video, and film as related to the fundamentals of composition, space relationships, effects of color, form, pattern repetition, structure, figure-ground relationships, balance, and unity.

ART 1131 Visual Studies Foundation 2 4 QH

Explores three-dimensional form. Examines principles including mass, volume, line, plane, and texture. Introduces basic materials and structure through constructing models and prototypes. Presents sequential exercises with simple eye/hand skills and form recognition. Explores complex projects that require an understanding of context, content, and developing original forms. *Prereq.* ART 1124 and ART 1130.

ART 1132 Principles of Graphics 4 QH

Offers intensive study in graphic form principles through assigned problems, critiques, and lectures that emphasize formal and conceptual understanding. Develops the visual problem-solving process including comprehending problem objectives, working to specifications, investigating alternatives, and presenting professionally crafted solutions. *Prereq.* ART 1130 or permission of instructor.

- ART 1133 Graphic Design 1** 4 QH
Introduces applied graphic design. Explores photographic image making and manipulation, as well as letterform and type, as approaches to visual problem-solving. Emphasizes formal relationships and investigates concept development through sequence and series. Refers to visual books, graphic system, and moving images. *Prereq.* ART 1132, ART 1134, and ART 1160.
- ART 1134 Typography 1** 4 QH
Introduces letterforms in visual communication. Studies typography as form, typographic contrast principles, text organization and hierarchy, the typographic grid, legibility, and letterspacing. Explores the history and variety of typefaces. Includes assigned projects, readings, and lectures. *Prereq.* ART 1130 or permission of instructor.
- ART 1144 Typography 2** 4 QH
Builds on the letterform, typography, and grid studies begun in ART 1134 and applies them in a series of projects that focus on text type, legibility, readability, structure, and contrast in publication design and in typographic approaches to information design. *Prereq.* ART 1134.
- ART 1150 Architectural Design 1** 4 QH
Introduces conceptual thinking about the design of the built environment. Recent studio work has included analyses of seminal modern houses, design projects for memorials, idea-based houses, and the urban landscape. Focuses on integrating imagination into solving these design problems. *Prereq.* ART 1156.
- ART 1151 Architectural Design 2** 4 QH
Introduces the structure and order of architectural thinking. Includes projects such as compositional exercises, formal analysis, and additions to important modern buildings. Studies the analytical tools for understanding the relationship of building elements to the ideas that inform them. *Prereq.* ART 1150.
- ART 1156 Architectural Drafting** 4 QH
Introduces architectural drafting techniques, tools, materials, lettering, and dimensioning. Students will be expected to make orthographic, axiometric, one- and two-point perspective drawings.
- ART 1160 Introduction to Photography** 4 QH
Explores the basics of black and white photography. Introduces the 35mm camera, negative processing, and black and white printing in the department's state-of-the-art lab. No camera nor previous photography experience required.
- ART 1170 Filmmaking Workshop** 4 QH
Introduces students to the nature and creative uses of video. Examines video's technological foundation, conventions, and aesthetic potential. Emphasizes weekly hands-on lab assignments and substantive final project. Includes lectures, screenings, and critiques. Facilities and equipment are provided by the department.
- ART 1180 Video Basics** 4 QH
Introduces the fundamental nature of the video medium and its creative use. Examines the technological foundation of video, the established conventions of effective field and studio production techniques and postproduction techniques (electronic editing), and explores the aesthetic potential of both the visual and auditory aspects of video. Emphasizes weekly hands-on lab assignments with a final substantive video project required of each student. Facilities and equipment are provided.
- ART 1190 Introduction to Computer Graphics** 4 QH
Introduces visual problemsolving with computers. Emphasizes the medium's special properties and its potential. *Prereq.* ART 1130 and ART 1131 or permission of instructor.
- ART 1203 Medieval Architecture** 4 QH
Studies the major religious and secular buildings of the Early Christian, Byzantine, and Gothic periods, emphasizing Gothic architecture of France and England.
- ART 1204 Renaissance Architecture** 4 QH
Focuses on architecture and urban form in Italy between 1400 and 1600, with some emphasis on Renaissance architecture in France and England.
- ART 1205 Renaissance Art** 4 QH
Examines Italian painting and sculpture from the early fourteenth century to the end of the sixteenth century, with emphasis on the art of the great painters and sculptors of the period such as Botticelli, Donatello, Leonardo, Michelangelo, and Titian. The art will be considered in the context of the social, political, philosophical, and religious issues of the time. (III)
- ART 1210 Nineteenth Century Painting** 4 QH
Examines European painting and related arts including the neo-classical, romantic, realist, and impressionist movements. Emphasizes French painting, but also considers important developments in England and other western European countries.
- ART 1213 Modern Art** 4 QH
Traces the development of painting, sculpture, and related arts from European avant-garde in the late nineteenth century to the international market of the late twentieth century. Topics include challenges to traditional boundaries between media, the development of abstraction and the idea of pure form, and the recent emergence of a post-modern aesthetic.
- ART 1218 African-American Art History** 4 QH
Offers a historical and critical examination of African-American art from the nineteenth century to the present, with special emphasis on the effects of European and African art styles on the black artist in America.
- ART 1220 American Art** 4 QH
Surveys the history of American painting and sculpture from the seventeenth century to the present. Focuses on the cultural forces that shape the evolution of art in America. Includes frequent museum visits.
- ART 1223 American Architecture** 4 QH
Introduces American architecture, town planning, and urban design from the 1700s to the 1930s. Considers European influences and uniquely American contributions.
- ART 1225 Modern Architecture 1** 4 QH
Surveys the development of modern architecture in England, France, Germany, and the United States from the mid-eighteenth to the late nineteenth century. Discusses architecture and urban design as a cultural response to society's changing conditions. Considers such themes as symbolism, morality, rationalism, and functionalism. *Prereq.* ART 1111 or permission of instructor.

- ART 1226 Modern Architecture 2** 4 QH
Examines the forms and principles of European and American architecture of the twentieth century, emphasizing the work of such key figures as Frank Lloyd Wright, Mies van der Rohe, Le Corbusier, and Louis Kahn; and such influential movements as the Dutch de Stijl, Russian constructivism, and American post-modernism.
- ART 1230 History of Photography** 4 QH
Explores photography from its origins in the early nineteenth century to its maturity in the mid-twentieth century. Surveys technological developments but emphasizes the emergence of photography as an expressive medium and its relation to other modern art forms.
- ART 1233 Contemporary Directions in Photography** 4 QH
Studies prevailing trends in photographic artistic expression from the beginning of the twentieth century to the present. Examines the importance of photographic imagery in relation to our surroundings through lecture and slide presentations.
- ART 1235 History of Film** 4 QH
Surveys major international developments in film from the late nineteenth century to the present. Examines national movements, technological and aesthetic innovations, important figures, and significant films. Includes films, lectures, and discussions.
- ART 1236 American Film** 4 QH
Surveys the rise of the American film from the late nineteenth century to the present. Examines key films, directors, major themes, and film forms and techniques. Includes lectures, screenings, and discussions.
- ART 1240 History of Graphic Design** 4 QH
Considers the history, context, and issues of graphic design through lectures, readings, discussions, and projects. *Prereq.* ART 1101.
- ART 1243 Graphic Design 2** 4 QH
Investigates the expressive visual potential of words and images. Explores visual poetry, the connotations of mark and form choice, and applied semiotics. Includes assigned projects, readings, discussions, and lectures. *Prereq.* ART 1133 and ART 1250.
- ART 1244 Graphic Design 3** 4 QH
Introduces problem-solving methodologies and applies them to complex communications problems. Uses research, teamwork, and brainstorming to define the problems, and develops and formally refines the solutions. *Prereq.* ART 1243.
- ART 1250 Color Theory and Practice** 4 QH
Focuses on the optical phenomena of color and their application in visual communication. Studies hue, value, and saturation, and their implications for color activity, legibility, and spatial illusion in traditional and electronic media.
- ART 1252 Architectural Design 3** 4 QH
Addresses the issue of building typology. Offers students the opportunity to learn to use, as models in their own work, the formal, organizational, and cultural similarities of buildings from throughout history with similar uses. Gives meaning to the study of architectural history and allows history to inform the current design process. *Prereq.* ART 1151.
- ART 1253 Architectural Design 4** 4 QH
Studies the effect of external circumstance on the architectural process. In addition to studying historical urbanism, students will work with ideas about landscape and aesthetic frameworks that can govern projects from without. Projects are studied at several scales, from the aerial map to the building detail. *Prereq.* ART 1252.
- ART 1254 Intermediate Drawing** 4 QH
Focuses on heightening the student's understanding of spatial awareness, scale movement, and expression. Students will be asked to create unusual environmental situations for their figurative compositions. A variety of media will be used, including wash, pen and ink, watercolor, chalk, charcoal, and pencil. *Prereq.* ART 1124 or *equiv.*
- ART 1256 Theory of Structures 1** 4 QH
Introduces the theory of materials and structures. Examines basic structural elements in masonry and wood construction. Uses historic and current building types to explore the relationship between structure, materials, construction process, and architectural space. Includes lectures, discussions, field trips, and student presentation of structural models and diagrams. *Prereq.* PHY 1222.
- ART 1257 Theory of Structures 2** 4 QH
Continues ART 1256, combining the basic structural elements to develop structural systems. Explores form, stability loading, and materials in relation to the design of foundation, structural steel, reinforced concrete, timber, frame, space frame, and shell systems. *Prereq.* ART 1256 and PHY 1222.
- ART 1258 Architectural Design 5** 4 QH
Studies the construction and fabrication processes and the impact of these processes on the thinking of designers. Examines the relationship between schematic ideas and materials. *Prereq.* ART 1226 and ART 1253.
- ART 1259 Architectural Design 6** 4 QH
Studies the work of a particular architect or architectural movement. Students are expected to relate their design solutions to the buildings and design principles created by the architect or architectural movement chosen for the course. *Prereq.* ART 1226 and ART 1258.
- ART 1261 Intermediate Black and White Photography** 4 QH
Emphasizes combining personal aesthetic choices with refined darkroom skills. A second-level black and white photography studio/lab course. The zone system for roll film cameras, toners, fiber based papers and alternative film choices will be demonstrated and assigned. A final portfolio is required for successful completion of the course. Lab fee. *Prereq.* ART 1160 or *equiv.*
- ART 1263 Introduction to Color Photography** 4 QH
Introduces shooting, processing, and printing color negative films. Lectures cover basic color theory in relationship to photography as well as contemporary color photographic processes. Working with color negative films, students get hands-on experience in the C-41 process for developing film and the EP-2 process for printing color negatives. Weekly assignments emphasize solving technical and aesthetic problems inherent in dealing with color negative materials. Hands-on labs allow students to produce final projects. Color chemistry and facilities are provided. *Prereq.* ART 1160 or *equiv.*

ART 1265 Color Transparency Production and Printing**4 QH**

Covers shooting, processing, and printing of color transparency materials. Discusses and demonstrates E-6 and Cibachrome processes. Encourages experimental processes such as transparency film cross-processed, negative films cross-processed, and transparency film pushed and cross-processed. Lectures are supported by weekly critiques of student work; assignments stress the solving of technical and aesthetic problems. Lab time allows the student to produce the required final project and offers one-to-one interaction with the instructor. Chemistry and lab facilities are provided. *Prereq.* ART 1160 or *equiv.*

ART 1280 Media Graphics**4 QH**

Offers applied video design projects. Develops visual logic, sequence, motion, and legibility. Includes assignments, demonstrations, and lectures. *Prereq.* ART 1180 and ART 1243.

ART 1281 Video Project**4 QH**

Offers in-depth exploration of the video medium. Students research, write, and produce a documentary, fictional narrative, or experimental video project. Emphasizes innovation, personal authorship, effective research, sound conceptual development, formal and technical skills, and imaginative and creative soundtracks and visuals in video. *Prereq.* ART 1180 or *equiv.*

ART 1285 Interarts**4 QH**

Introduces the dynamics of interdisciplinary art in a team-taught course. Interarts presents contemporary art forms existing outside the established traditions of fine arts. Art concepts investigated include time, systems, kinetics, environments, phenomenology, politics, and collaborations. A hands-on, project-oriented course where upper level students work in small groups to explore the interrelationships of media utilizing light, sound and video within installation, performances, dances, and events. Exposes students to a range of contemporary subjects through video/slide presentations, live performances, selected readings, and lectures by visiting artists. *Prereq.* ART 1124, ART 1130, ART 1131 or *permission of instructor.*

ART 1290 Electronic Publishing Design**4 QH**

Investigates publication and periodical design issues including concept development, sequence, organization, page design, typography, and the typographic grid. Includes assignments using page layout software in the computer labs. *Prereq.* ART 1132, ART 1134, and ART 1190 or *equiv.*

ART 1291 Intermediate Computer Graphics Workshop**4 QH**

Offers the opportunity to pursue individual projects and assigned studies in the computer environment. *Prereq.* ART 1190 and ART 1243 or *permission of instructor.*

ART 1295 Computer-Aided Design**4 QH**

Introduces CAD processes for two- and three-dimensional modeling for architectural design. Studies computer-aided design techniques that support site and program analysis concept and schematic design, and design development and construction drawing applications. *Prereq.* ART 1190 or *equiv.*

ART 1296 Advanced Studio in Computer Visualization**4 QH**

Continues ART 1295. Offers detailed, hands-on instruction in computer modeling and rendering. Offers students the opportunity to learn to manipulate two-dimensional, three-dimensional, and

video images using IBM computers and AutoCAD. Includes topics such as ray tracing, solid modeling, and image synthesis.

Prereq. ART 1295.

ART 1310 Seminar in Modern Architecture**4 QH**

Explores contemporary issues in architectural theory, design, and practice. Examines historical forces and contemporary criticism to define the nature of modernism and post-modernism. Focuses on such architects as Louis Kahn, IM Pei, Philip Johnson, Robert Venturi and Denise Scott-Brown, Michael Graves, and Frank Gehry. *Prereq.* ART 1228 or *permission of instructor.*

ART 1330 Advanced Visual Communication**4 QH**

Presents an advanced interdisciplinary studio seminar in visual and media design. In a chosen area of specialization, students explore their capabilities through the practical application of conceptual and technical skills. Lab fee. *Prereq.* ART 1144 and ART 1244 or *permission of instructor.*

ART 1350 Architectural Thesis**4 QH**

Offers an opportunity for each student to frame his or her own architectural problem and to formulate a response. Expects students to arrive with a project proposal and to review that proposal with the instructor over the first two weeks, spending the remainder of the quarter developing the project.

ART 1355 Environmental Systems**4 QH**

Surveys the environmental systems of power, air, water, waste, and light as integral elements of architecture. Discusses the theory and practice of these systems in architectural design. Considers historical and contemporary examples of building systems that illustrate the function, technology, and aesthetics of environmental systems. Includes field trips, lectures, and individual student research projects. *Prereq.* ART 1252.

ART 1363 Advanced Photography Seminar**4 QH**

Provides close interaction between student and teacher. Students are asked to refine their technical skills and to make meaningful decisions about their relationship to the world around them through the use of black and white and/or color photography. Portfolio preparation, alternative processes, and large format will be combined to form a base of skills with which to present the student's work to a larger photographic community. Stresses individual direction and a qualitative approach to substantive photography. *Prereq.* *Permission of instructor.*

ART 1713 Modern Art (Honors)**4 QH**

Combines in-depth investigation of selected modern artists and movements with an overview of the diverse meanings and functions of modern art. Involves developing and presenting individual research projects. *Prereq.* *Honors status or permission of instructor.*

ART 1800, ART 1801, ART 1802 Directed Study**4 QH each**

Offers independent work under the direction of members of the department on a chosen topic. *Prereq.* *Junior or senior art major and department approval.*

**ART 1810, ART 1811, ART 1812, ART 1813
Junior/Senior Honors Program****4 QH each**

For details contact the honors office.

Biology

Courses are presented in three categories: non-science majors; health-related science and other non-biology science majors; and biology majors. Two or more courses with substantially the same content may not be counted toward quantitative graduation requirements. If a student is not sure whether particular courses overlap it is his/her responsibility to get advice from a departmental advisor.

The following courses are primarily for non-science majors. These courses are not open to biology majors.

BIO 1111 Environment and Man 4 QH
Offers an ecological analysis of man's interaction with other organisms. Presents the necessary foundation of biological principles. (II) *Not open to biology majors.*

BIO 1171 Focus on the Sea: Issues and Nature 2 QH
Explores marine conservation issues through lectures, discussion, and field trips to coastal habitats and islands. Studies the sea from ecological, economic, and literary perspectives.

BIO 1175 Introduction to Marine Biology 4 QH
Offers a broad introduction to the field emphasizing principles of oceanography and marine biology. Presents the physical, geological, and biological aspects of the ocean. Discusses the diversity of marine life and how organisms interact within different marine communities.

BIO 1181 The Human Organism 4 QH
Introduces the structure and function of the human body. Emphasizes the principles of biological and physical science as they relate to life processes in health and disease. Lab experiments explore the workings of the students' own biological systems rather than those of other animals. Lab fee.

BIO 1187 Biology of Human Reproduction 4 QH
Studies the sexual and reproductive function in the human male and female, including sexual development, coitus, fertilization, pregnancy, birth, and lactation. Discusses the methods of controlling fertility and sexually-transmitted disease. Analyzes factors affecting reproduction and sexuality in various human populations.

The following courses are primarily for majors in science- or health-related professions. These courses are not open to biology majors.

BIO 1106 General Biology 4 QH
Focuses on universal properties and processes of living organisms. Topics include cellular composition and cellular control, heredity, the evolutionary process, and environmental relationships. Lab fee. (Overlaps BIO 1140.)

BIO 1107 Animal Biology 4 QH
Offers a systematic comparative study of the structure and functions of animals. Considers the diversity of animals from the standpoint of evolutionary adaptation. Lab fee. (Overlaps BIO 1141.) *Prereq.* BIO 1106.

BIO 1115 Introduction to Human Biology 4 QH
Introduces students to cell biology, genetics, and animals, such as roundworms, that cause health problems. Lab fee. *Not open to biology majors.*

BIO 1120 Basic Microbiology 4 QH
Microbial life, emphasizing morphological characteristics, physiological activities, and disease production. Lab fee. (Overlaps BIO 1320, BIO 1121, and BIO 1221.) *Prereq.* BIO 1140, or permission of instructor; not open to biology majors.

BIO 1121 Introductory Microbiology 3 QH
Same as BIO 1120, but without lab. *Not open to biology majors.*

BIO 1140 Basic Animal Biology 1 4 QH
Covers principles of biology; universal properties and processes of living organisms as exemplified by the cell and its activities, inheritance, evolution, and environmental relationships. Lab fee. (Overlaps BIO 1106.) *Not open to biology majors.*

BIO 1141 Basic Animal Biology 2 4 QH
Offers systematic, comparative study of the structure and functions of animals. Considers the diversity of animals from the standpoint of evolutionary adaptation. Lab fee. (Overlaps BIO 1107.) *Prereq.* BIO 1140; not open to biology majors.

BIO 1150 Functional Human Anatomy and Physiology 1 5 QH
Covers cell and tissue structure and function, anatomical terminology, and the anatomy and physiology of bones, muscles, and the nervous system. Lab includes the study of human bones and muscles, pig dissection, and muscle and nerve physiology. Lab fee. (Overlaps BIO 1152.)

BIO 1151 Functional Human Anatomy and Physiology 2 5 QH
Covers anatomy and physiology of the respiratory, digestive, urogenital, endocrine, and cardiovascular systems, and a brief exploration of the anatomy and physiology of the eye and ear. Lab includes studies of sensory physiology, enzymes, metabolism, and cardiovascular, respiratory, and urinary function. Lab fee. (Overlaps BIO 1153 and BIO 1154.) *Prereq.* BIO 1150.

BIO 1152 Integrated Human Anatomy and Physiology 1 4 QH
Introduces students to human anatomy and physiology. Focuses on cell and tissue structure and function; and anatomy and physiology of skin, bones, muscles, and blood. Lab includes pig dissection. Lab fee. (Overlaps BIO 1150.)

BIO 1153 Integrated Human Anatomy and Physiology 2 4 QH
Presents the structure and function of the following systems: nervous, endocrine, and reproductive. Lab includes pig dissection. Lab fee. (Overlaps BIO 1151.)

BIO 1154 Integrated Human Anatomy and Physiology 3 4 QH
Presents the structure and function of the cardiovascular, respiratory, urinary, and digestive systems and the regulation of metabolism and body temperature. Lab includes pig dissection. Lab fee. (Overlaps BIO 1151.) *Prereq.* BIO 1153.

The following courses are primarily for biology majors but are open to other students with appropriate prerequisites and permission of the instructor.

BIO 1103 Principles of Biology 2 5 QH
Introduces basic biology principles. Topics include: What is the nature of scientific thought and knowledge? Why do we need oxygen? How do membranes direct traffic flow? What are genes made of? How was the structure of DNA discovered? How were dinosaurs cloned in the film, *Jurassic Park*? Introductory course for students planning to major in biology or biochemistry. Topics

are organized into three basic themes for the course: the molecular and cellular levels of biological organization; the flow of energy through the living world and how metabolic processes capture and transform energy for biological use; and the transmission of information through a study of genetics and DNA. The laboratory involves demonstrations and hands-on practicals of the concepts discussed in lecture. Lab fee.

BIO 1104 Principles of Biology 2**5 QH**

Introduces the diversity of animals through presentation of their systematic relationships, structure and function, and ecological roles. Cellular, tissue, and organismal levels are included. Coordinated with laboratory observations. Lab fee. *Prereq.* BIO 1103.

BIO 1105 Principles of Biology 3**5 QH**

Examines the biology and diversity of plants and plant-like organisms. Plants have such a close line with human activity and enterprise that a basic understanding of this relationship is essential for any educated person, whether that person is a science major or not. Begins by looking at the origins of plant study with a broad historical perspective illustrating the relationship between plants and humans in three particular areas: 1) Feeding a Starving World; 2) Curing a Sick World; and 3) Engineering a Better World. Topics include the plant model versus the animal model of cell structure, growth, development, and reproduction. Topics are followed by a section dealing with plant diversity and examines such organisms as the plant-like protists, mushrooms and molds, mosses, ferns, gymnosperms, and flowering plants. What do these organisms have in common? How are they different? How do they reproduce? How do they affect our lives? Lab fee. *Prereq.* BIO 1103, BIO 1104.

BIO 1211 Environmental and Population Biology**4 QH**

Considers physical and chemical factors of the environment as they affect the distribution of organisms and as they may in turn be affected by the organisms. Includes population dynamics, species interactions, population genetics (lightly), the development of communities, and the structure and function of ecosystems. Lab fee. *Prereq.* BIO 1105, BIO 1106, BIO 1107 or BIO 1103, BIO 1104, BIO 1105, and CHM 1111.

BIO 1260 Genetics and Developmental Biology**4 QH**

Focuses on elaboration of the classic laws of heredity, cytogenetics, molecular basis of heredity, and selected examples of the development of form and function. Lab fee. *Prereq.* BIO 1107-BIO 1133 or BIO 1103-BIO 1105, and CHM 1264.

BIO 1261 Introductory Biochemistry**4 QH**

Topics include structure and function of biomolecules, central concepts of bioenergetics and thermodynamics, enzyme kinetics and regulation, and metabolic pathways. Lab fee. *Prereq.* BIO 1103-BIO 1105 or BIO 1106, BIO 1107, BIO 1260, CHM 1221, and CHM 1265.

BIO 1270 Diving Research Methods**4 QH**

Introduces students to techniques in the study, ecology, and physiology of subtidal marine organisms. Focuses on underwater research methods, their appropriate applications, and their implementation during field exercises under water. Topics to be covered include diving physiology, sampling design, experimental design, statistical analysis of data, population censusing methods, under water measurements of hydrodynamics, in situ respirometry, underwater telemetry, underwater photography, and the use of underwater habitats and submersibles in research. Lab fee. *Prereq.* Scuba certification.

BIO 1311 Evolution**4 QH**

Discusses history of evolutionary theory and lines of evidence. Emphasis is placed on mechanisms or speciation. Introduces current evolutionary topics. Laboratory involves students in library research. *Prereq.* BIO 1104 or BIO 1107, BIO 1211, and BIO 1260.

BIO 1312 Marine Ecology**4 QH**

Studies marine habitats and organisms. Focuses on primary and secondary productivity, and community structure and dynamics. Emphasizes through field work the Pacific Northwest intertidal and shallow subtidal communities. East/West program. *Prereq.* Two years of college biology.

BIO 1320 General Microbiology**5 QH**

Provides morphological, ecological, and biochemical consideration of representative groups of bacteria. Introduces virology and microbial genetics; host-parasite relationships, including basic immunological considerations; prokaryotes of medical significance; and physical and chemical controls of microbial growth. (Overlaps BIO 1120 and BIO 1221.) Lab fee. *Prereq.* BIO 1103, BIO 1104, BIO 1105, CHM 1111, and CHM 1122.

BIO 1330 Marine Botany**4 QH**

Explores taxonomy of the major groups of marine plants, primarily algae. Investigates ecological and reproductive strategies, economic importance, and roles in diverse marine communities. Mandatory field trips in addition to lab. Lab fee.

BIO 1332 Molecular Marine Botany**4 QH**

Introduces modern biochemical and molecular approaches used to examine systematic and evolutionary problems at the species level and above. Offers extensive hands-on laboratory experience in isozyme electrophoresis, DNA isolation, and restriction fragment analysis. Expects students to conduct individual projects, applying techniques they have learned to topics dealing with the local seaweed and seagrass flora. Lab fee. *Prereq.* BIO 1330.

BIO 1341 Vertebrate Zoology**4 QH**

Discusses the systematics, behavior, ecology, and zoogeography of all classes of vertebrates. Laboratories consist of study of vertebrate specimens and field trips to observe species in their habitats. Lab fee. *Prereq.* BIO 1104 or BIO 1107.

BIO 1342 Biology of Crustacea**4 QH**

Studies systematics, morphology, and biology of the smaller Crustacea. Focuses on non-malacostracan orders, but includes those malacostracan taxa dominated by small forms. *Prereq.* BIO 1370 or GEO 1428 or permission of instructor.

BIO 1347 Embryology**5 QH**

Topics include gametogenesis, fertilization, cleavage, gastrulation, induction, organogenesis, and metamorphosis in vertebrates. Emphasis is on frog, chick, and pig in the lab. Lab fee. *Prereq.* BIO 1107 or BIO 1105, and BIO 1260.

BIO 1348 Animal Histology**4 QH**

Offers microscopic study of fundamental types of animal tissues. Lab fee. *Prereq.* BIO 1105 or BIO 1107.

BIO 1350 Regulatory Cell Physiology**5 QH**

Introduces physiological control systems including transport processes, cellular basis of nerve function, action of chemical messengers and regulators, and principles of cellular contraction

and motility. Lab fee. *Prereq.* BIO 1103 and BIO 1104, or BIO 1106 and BIO 1107.

BIO 1351 Comparative Vertebrate Anatomy 5 QH

Focuses on morphology and phylogeny of the vertebrates. Lab studies taxonomy of the group and specific morphology of the dogfish shark, the mud puppy, the alligator, and the cat. Lab fee. *Prereq.* BIO 1105 or BIO 1107.

BIO 1370 Marine Invertebrate Zoology 5 QH

Topics include functional morphology, systematics, ecology, and phylogenetic relationships of the major invertebrate phyla. Lab emphasizes utilization of living marine forms, with dissection of representative organisms. Lab fee. *Prereq.* BIO 1105 or BIO 1107.

BIO 1371 Biological Oceanography 4 QH

Offers labs and lectures encompassing the principles of biological oceanography. Topics include physical and chemical aspects of the ocean environment, the distribution, production, and interactions of marine planktonic organisms, and ecosystem characteristics of specific oceanographic environments. Emphasizes participation in sampling and analysis using current instrumentation and methods. Lab fee. *Prereq.* BIO 1104, BIO 1107, BIO 1141, or *equiv.*

BIO 1412 Benthic Marine Ecology 4 QH

Examines the interactions among bottom-dwelling invertebrates, fish, and plants and their environment. Quantitative field methods and new developments in ecological theory will be applied to examinations of the rocky intertidal zone, soft sediment areas, salt marshes, and the rocky subtidal zone. Lab fee. *Prereq.* BIO 1211; BIO 1341 recommended.

BIO 1413 Tropical Terrestrial Ecosystems 3 QH

Introduces students to the plants, animals, and ecosystems of terrestrial Jamaica. East/West Program. *Prereq.* Two years of college biology.

BIO 1420 Microbial Physiology 4 QH

Focuses on structure and function of the bacterial cell, emphasizing its general properties as well as on the physical and chemical factors that influence it. Lab fee. *Prereq.* BIO 1320 or *equiv.*

BIO 1427 Medical Microbiology 4 QH

Topics include host parasite interactions: virulence, toxins, natural flora, immunological responses; characteristics of the common bacterial, rickettsial, and protozoal infections in humans; epidemiology, pathology, vaccines, and chemotherapy. Lab fee. *Prereq.* BIO 1320 or *equiv.*

BIO 1430 Plant Physiology 4 QH

Focuses on the physiology and biochemistry of plants as a whole and at the cellular and organ levels. Considerations of mineral and nutrition, photosynthesis, hormones, growth, and development are included. Attendance at a weekly four-hour lab, as well as preparation of a paper based on the research literature, is required. Lab fee. *Prereq.* BIO 1105 or BIO 1133, and CHM 1265.

BIO 1432 Higher Plants 4 QH

Studies the origin and evolution of land plants. The invasion of the land surface by plants, particularly vascular plants, occurred in late Silurian and Devonian time, approximately 405 to 370 million years ago. The flora that covers Planet Earth today is vastly different from the flora of those early geological days. What were the early land plants like? How did they evolve into the complex

land plant flora that we see today? Which taxa have survived unaltered till present day? How did seed-bearing plants develop? What is the nature of the complex reproductive structure we call the flower? These questions and others are the focus of this course on higher land plants. Lab fee. *Prereq.* BIO 1105.

BIO 1437 Structural Botany 4 QH

Examines the structural and molecular aspects of plant development beginning with the fertilization apparatus of higher plants and the development of the embryonic plant. Studies the structure and development of the vegetative and reproductive organs of the plant. Applies the advances in the fields of cellular and molecular biology to the interpretation of plant development. Students will progress from learning fundamental information on each topic through reading contemporary research papers. Student projects will be the focus of the laboratory. Lab fee. *Prereq.* BIO 1105.

BIO 1440 Advanced Invertebrate Zoology 4 QH

A lecture, field, and lab course that concentrates on one or two phyla. Subject varies from year to year, depending upon expertise of available faculty. An individual research project is required. Lab fee. *Prereq.* Two years of college biology.

BIO 1441 Parasitology 4 QH

Focuses on symbiotic relationships of protozoans, mesozoans, flatworms, nematodes, acanthocephalans, and arthropods. Lab. Lab fee. *Prereq.* BIO 1107 or BIO 1105, and BIO 1260.

BIO 1442 Vertebrate Paleontology 4 QH

Examines evolution of the vertebrates, including humans, as revealed through the fossil record. Lab, museum, and field studies. Lab fee. *Prereq.* BIO 1107 or BIO 1105, BIO 1211, BIO 1260; or permission of instructor.

BIO 1444 Wildlife Biology 5 QH

Presents concepts and techniques utilized in the conservation and study of wild vertebrates in lecture, laboratory, and weekly field trips. Subjects include habitat management, endangered species, exotic species, zoonoses, financing, and legislation. Lab fee. *Prereq.* BIO 1104 or BIO 1107, BIO 1211, and BIO 1341.

BIO 1446 Ornithology 4 QH

Discusses anatomy, physiology, behavior, ecology, and systematics of birds. Laboratories include study of specimens and field identification. Lab fee. *Prereq.* BIO 1104 or BIO 1107, and BIO 1211.

BIO 1447 Herpetology 4 QH

Lectures emphasize the natural history, behavior, systematics, and zoogeography of recent amphibians and reptiles. Lab consists of identification and preparation of specimens, particularly local species. Mandatory field trips. Lab fee. *Prereq.* BIO 1105 or BIO 1107, and BIO 1260.

BIO 1448 Mammalogy 5 QH

Discusses anatomy, physiology, behavior, ecology, and systematics of mammals. Laboratories involve study of specimens, museum preparation, and field collection, including a weekend field trip. Lab fee. *Prereq.* BIO 1104 or BIO 1107, and BIO 1211.

BIO 1449 Marine Birds and Mammals 4 QH

Focuses on the phylogeny, systematics, zoogeography, morphology, physiology, reproduction, behavior, and ecology of birds and mammals associated with the marine environment, with lab emphasis on species that occur along the New England coast.

Labs include identifying, dissecting, and preparing specimens. Lab fee. *Prereq.* BIO 1211 and BIO 1104 or BIO 1107, and BIO 1141.

BIO 1450 Immunology**4 QH**

Provides an overview of the structure and function of genes, proteins, and cells involved in the generation of the immune response. Emphasizes molecular immunology and immunogenetics. *Prereq.* BIO 1261. *Take concurrently with BIO 1467.*

BIO 1453 General Physiology of Invertebrates**4 QH**

Surveys basic animal functions as manifested among the major groups of invertebrates, with comparisons to the vertebrates, especially aquatic vertebrates. Considers the cellular and biochemical bases for the functions, their control, their adaptiveness to diverse environments, and their evolutionary implications. Topics usually include respiration, circulation, nutrition, metabolism, excretion, salt and water balance, temperature responses, biological clocks, sensory organs, and various effector organs. Lab fee. *Prereq.* BIO 1261.

BIO 1454 Systems Physiology**4 QH**

Covers function and regulation of major physiological systems in animals including energy metabolism, thermoregulation, muscle and movement, circulation, respiration, salt and water balance, and circadian rhythms. Emphasizes vertebrates but material on invertebrates will be included where appropriate. Lab fee. *Prereq.* BIO 1350 or BIO 1261 or permission of instructor.

BIO 1457 Neuroethology**4 QH**

Concentrates on the mechanisms underlying behavior of model invertebrates and lower invertebrates in a lecture, field, and lab course. Aims to develop a framework to explain behavior in terms of properties and connectivity of neuronal circuits. Topics to be covered include: the cellular biology of neurons and neuronal circuits, the organization of sensory and motor systems, and field and lab analysis of simple behaviors. Lab fee. *Prereq.* BIO 1105.

BIO 1460 Current Concepts in Cell Biology**4 QH**

Examines selected topics in cellular structure and function of eukaryotes, for example, compartmentalization and its underlying physical and biochemical processes. Topics will vary. Lab fee. *Prereq.* BIO 1261.

BIO 1461 General Biochemistry 1**4 QH**

Surveys biochemistry, emphasizing protein structure, the nature of enzymic catalysis, bioenergetics, and the metabolism of carbohydrates, lipids, nucleotides, and amino acids. *Prereq.* BIO 1260 and organic chemistry.

BIO 1462 General Biochemistry Laboratory**4 QH**

Introduces modern research techniques used in biochemistry and molecular biology. Topics include purification and characterization of proteins, kinetic properties of enzymes, isolation of high molecular weight DNA, recombination of DNA molecules in vitro, isolation of bacterial clones containing recombinant molecules, and in vitro mutagenesis. Covers safety and moral concerns raised by genetic engineering. Includes two lab periods and one lecture per week. Lab fee. *Prereq.* BIO 1461 or BIO 1261.

BIO 1463 General Biochemistry 3**4 QH**

Emphasizes the structure and function of organelles, mechanisms of signal transduction, and regulation of gene expression. *Prereq.* BIO 1461 or BIO 1261.

BIO 1467 Molecular Biology**4 QH**

Studies current theories of the detailed molecular mechanisms for the preservation, expression, and evolutionary development of biological information. Emphasizes experimental design and proof in macromolecular chemistry and genetics. *Prereq.* BIO 1261.

BIO 1470 Coastal Biology (Washington Coast)**4 QH**

Includes studies of the open ocean, rocky intertidal areas, sandy beaches, and estuarine environments of the Washington coast. Demonstrates basic biological principles through comparative studies. The first of a series of three courses intended to introduce the student to a wide range of coastal environments. East/West Program.

BIO 1471 Coastal Biology (Caribbean Coast)**4 QH**

Includes studies of the open ocean, rocky intertidal areas, sandy beaches, and estuarine environments of the Caribbean. Demonstrates basic biological principles through comparative studies. The second of a series of three courses intended to introduce the student to a wide range of coastal environments. East/West Program.

BIO 1472 Coastal Biology (New England Coast)**4 QH**

Includes studies of the open ocean, rocky intertidal areas, sandy beaches, and estuarine environments of the New England coast. Demonstrates basic biological principles through comparative studies. The third of a series of three courses intended to introduce the student to a wide range of coastal environments. Offered at Marine Science Center in Nahant.

BIO 1475 Biology and Ecology of Fish**4 QH**

Examines the ecology, evolution, systematics, and behavior of fish. Uses field study, lectures, and labs. Studies specimens taken from New England waters. Lab fee. *Prereq.* Two years of college biology.

BIO 1477 The Biology of Corals**4 QH**

Concentrates on tropical cnidaria in a field, lecture, and lab course. The course will study the systematics, anatomy, physiology, and ecology of this group of animals which assume such an important role in tropical marine ecosystems. East/West Program. *Prereq.* Two years of college biology.

BIO 1478 The Biology of Fishes**5 QH**

A field, lecture, and lab course that examines the systematics, anatomy, behavior and ecology of fish. Tropical forms are emphasized. *Prereq.* Two years of college biology.

BIO 1479 Adaptations of Aquatic Organisms**4 QH**

Explores aquatic organisms through a study of their evolutionary responses to the aquatic habitat. Considers the physical properties of water that have affected form, function, and behavior of all aquatic organisms. Uses density, viscosity, diffusion rates, pressure effects, and elementary fluid mechanics to explain such characteristics as the body shape of larvae, hearing and sound production, suspension feeding, and buoyancy. Course includes lectures, labs, demonstrations, and individual research projects. Offered at Marine Science Center in Nahant. *Prereq.* Two years of college biology.

BIO 1480 Senior Biochemistry Seminar**1 QH**

Examines recent developments in various topics of biochemistry. Emphasizes student presentation and analysis. *Prereq.* BIO 1103 through BIO 1261 or BIO 1463.

BIO 1490 Senior Seminar**1 QH**

Examines recent developments in various topics of zoology, microbiology, physiology, botany, ecology, genetics, and cell biology. Emphasizes student presentation and analysis. Limited to qualified juniors and seniors in the BA program and required of seniors in the BS program. *Prereq.* BIO 1103 through BIO 1261.

BIO 1491, BIO 1492 Directed Study 1, 2**2 QH each**

Offers independent work on a chosen topic under the direction of department faculty. Limited to qualified juniors and seniors with approval of the department and special arrangements with the supervising faculty member. The two quarters of this course together count as one biology department elective. *Prereq.* BIO 1103 through BIO 1261.

BIO 1495, BIO 1496, BIO 1497, BIO 1498**4 QH each****Junior/Senior Honors Project**

For details contact the honors office.

Chemistry

Introductory Chemistry Courses

CHM 1100 Special Topics in Chemistry**4 QH**

Examines fundamentals and applications of chemistry of particular interest to students in business. Discusses atomic theory, chemical bonding and reactions, states of matter and common chemicals, and foundations of organic chemistry. Makes applications to plastics and polymers, biochemistry, semiconductors, and nuclear power.

CHM 1101 General Chemistry for the Health Sciences 1**5 QH**

Examines topics in inorganic chemistry relevant to students in the health sciences. Topics include atomic structure; energy changes in physical and chemical processes; stoichiometry; chemical bonding; gases, liquids, and solids; solutions; acids and bases; equilibrium, and kinetics. Topics are related to molecular processes in the human body.

CHM 1102 General Chemistry for the Health Sciences 2**5 QH**

Introduces organic chemistry and organic substances of biological significance. Covers structure and reactivity of alkanes, alkenes, alkynes, aromatic compounds, oxygen containing compounds (alcohols, aldehydes, ketones, esters, ethers, and carboxylic acids), sulfur containing compounds (thiols and sulfides), nitrogen containing compounds (amines and amides), carbohydrates, proteins, lipids, and nucleic acids. Biological chemistry includes the study of enzymes, vitamins, metabolic pathways, and body fluids. *Prereq.* CHM 1101.

CHM 1111 General Chemistry for the Life Sciences 1**5 QH**

Designed for nonchemistry majors. Focuses on basic concepts and definitions: the mole concept and chemical stoichiometry, states of matter, solutions, periodicity of elements, atomic structure, and chemical bonding and reactions. Lab fee. (II)

CHM 1112 General Chemistry for the Life Sciences 2A**5 QH**

For students who will not be taking further chemistry. Covers chemical equilibria; acids, bases, and buffers; introduction to the organic chemistry of compounds of biological relevance; introductory biochemistry of proteins, carbohydrates, lipids, and nucleic acids. Lab fee. *Prereq.* CHM 1111.

CHM 1122 General Chemistry for the Life Sciences 2B**5 QH**

For nonchemistry majors who will be taking CHM 1264. Covers chemical kinetics and equilibria, acids and bases, elementary thermodynamics and kinetics, and electrolysis and electrochemistry. Lab fee. *Prereq.* CHM 1111.

CHM 1130 Fundamentals of Chemistry**4 QH**

Focuses on applications and principles of chemistry. Examines elementary atomic theory, physical and chemical properties of matter, chemical reactions and stoichiometry, and chemical measurements with applications in engineering technology.

CHM 1131 General Chemistry for Engineering Students 1**4 QH**

Primarily for engineering students. Introduces the principles of chemistry, focusing upon the states and structure of matter and chemical stoichiometry.

CHM 1132 General Chemistry for Engineering Students 2**4 QH**

Primarily for engineering students. Introduces the principles of chemistry, focusing upon chemical equilibria, the nature of some common materials, and energy considerations in chemical and nuclear transformations. *Prereq.* CHM 1131.

CHM 1138 General Chemistry Laboratory**1 QH**

Required for students planning to major in chemical engineering. Optional for other students taking CHM 1132. Experiments pertaining to lecture material. Lab fee.

CHM 1151 General Chemistry for Science Majors 1**5 QH**

For chemistry majors and selected students in other majors, such as biology, physics, and so on. Focuses on basic concepts and definitions, moles, gas laws, stoichiometry, atomic structure, periodic properties, and chemical bonding. Lab fee.

CHM 1152 General Chemistry for Science Majors 2**5 QH**

Covers solutions, chemical kinetics, chemical equilibrium, chemical thermodynamics, electrochemistry, chemistry of the representative elements. Lab fee. *Prereq.* CHM 1111 or CHM 1151.

Advanced Chemistry Courses

CHM 1221 Analytical Chemistry**4 QH**

For nonchemistry majors. Covers the principles and practice of chemical methods of analysis with an introduction to spectrophotometry, ion selective electrodes, and gas chromatography. Discusses methods and applications for the fields of biology, clinical chemistry, toxicology, and environmental investigations. Lab fee. *Prereq.* CHM 1122 or equiv.

CHM 1231 Analytical Chemistry for Majors**5 QH**

For chemistry majors. Covers the principles and practice of chemical methods of analysis with an introduction to spectrophotometry, ion selective electrodes, and gas chromatography. Examines method development, equilibrium limitations in analysis, and statistical evaluation of data as well as methods and applications for the fields of biochemistry, industrial chemistry, and chemical research. Lab fee. *Prereq.* CHM 1152 or equiv.

CHM 1264 Organic Chemistry for Biology Science Majors 1**5 QH**

For nonchemistry majors. Covers nomenclature, preparation, properties, and reactions of common organic compounds. Lab fee. *Prereq.* CHM 1122, CHM 1152, or equiv.

- CHM 1265 Organic Chemistry for Biology Science Majors 2** **5 QH**
Continues CHM 1264. Lab fee. *Prereq.* CHM 1264.
- CHM 1268 Organic Chemistry for Pharmacy Majors 1** **5 QH**
For pharmacy majors. Covers nomenclature, preparation, properties, and reactions of common organic compounds. Lab fee. *Prereq.* CHM 1122, CHM 1152, or equiv.
- CHM 1269 Organic Chemistry for Pharmacy Majors 2** **5 QH**
Continues CHM 1268. Lab fee. *Prereq.* CHM 1268.
- CHM 1271 Organic Chemistry for Chemistry Majors and Chemical Engineering Students 1** **3 QH**
For chemistry majors, chemical engineering students, and selected students in other majors. Covers synthesis and properties of aliphatic and aromatic hydrocarbons and their functional derivatives, correlation between the structure of organic compounds and their physical and chemical properties, and electronic interpretation of organic reactions. *Prereq.* CHM 1153 or CHM 1132, and CHM 1138 or equiv.
- CHM 1272 Organic Chemistry for Chemistry Majors and Chemical Engineering Students 2** **5 QH**
Continues CHM 1271. Lab fee. *Prereq.* CHM 1271.
- CHM 1273 Organic Chemistry for Chemistry Majors and Chemical Engineering Students 3** **5 QH**
Continues CHM 1272. Lab fee. *Prereq.* CHM 1272.
- CHM 1280 Physical Chemistry for the Life Sciences 1** **4 QH**
Examines physiochemical principles as they apply to biological processes. Covers thermodynamics, kinetics, equilibria, oxidation-reduction reactions, transport processes, quantum mechanics, and spectroscopy. *Prereq.* CHM 1122, CHM 1152, or equiv.
- CHM 1281 Physical Chemistry for the Life Sciences 2** **4 QH**
Continues CHM 1280. *Prereq.* CHM 1280.
- CHM 1381 Physical Chemistry 1** **3 QH**
Introduces chemical thermodynamics. Covers the three laws of thermodynamics and their applications to thermochemistry, material equilibrium, and reaction equilibrium. *Prereq.* CHM 1132, CHM 1152, or equiv.; MTH 1223, MTH 1243, or equiv.; PHY 1223, PHY 1233, or equiv.
- CHM 1382 Physical Chemistry 2** **3 QH**
Continues chemical thermodynamics, kinetics, and transport processes. Covers theoretical concepts and practical applications of phase equilibria, quantitative use of phase diagrams, kinetic molecular theory and applications to transport processes, reaction kinetics, and mechanism. *Prereq.* CHM 1381.
- CHM 1383 Physical Chemistry 3** **3 QH**
Presents the fundamental principles of quantum mechanics and their application to chemical problems. Emphasizes applications to atomic and molecular spectroscopy. *Prereq.* CHM 1382.
- CHM 1394 Experimental Physical Chemistry 1** **2 QH**
Presents experiments that demonstrate simple yet accurate ways of measuring fundamental physical chemical phenomena. Examines treating experimental methodology and error analysis. Introduces computer-based data analysis. Emphasizes the preparation of concise and literate laboratory reports. Lab fee. *Prereq.* CHM 1381 or taken concurrently.
- CHM 1395 Experimental Physical Chemistry 2** **2 QH**
Examines experiments based on various physical chemistry topics presented in CHM 1382. Explains and demonstrates computer interfacing of experimental apparatus. Focuses on data analysis using computer-based spread sheet and analysis programs. Emphasizes preparing concise and literate laboratory reports. Lab fee. *Prereq.* CHM 1382 or taken concurrently.
- CHM 1396 Experimental Physical Chemistry 3** **2 QH**
Focuses on experiments in atomic and molecular spectroscopy and molecular photophysics that illustrate the principles discussed in CHM 1383. Emphasizes experimental methodology and preparing reports. Lab fee. *Prereq.* CHM 1383 or taken concurrently.
- CHM 1422 Instrumental Methods of Analysis** **4 QH**
For chemistry majors and selected students in other majors. Covers principles, methods, and applications of electroanalytical chemistry, optical spectroscopy, and chromatography. Includes selected topics in instrumental design and function and in non-optical spectroscopy. *Prereq.* CHM 1382 and CHM 1231, or permission of instructor. Chemistry majors take CHM 1432 concurrently.
- CHM 1432 Instrumental Analysis Laboratory** **2 QH**
For chemistry majors and selected students in other majors registered for CHM 1422. Focuses on lab experiments related to topics covered in CHM 1422. Lab fee.
- CHM 1441 Inorganic Chemistry** **4 QH**
Studies atomic properties of free atoms and ions; ionic bonding and the structure of the solid state; the Madelung calculation; the Born-Haber and other thermodynamic cycles; valence-bond, molecular, orbital, and crystal field theories of bonding; stereochemistry of compounds of representative elements; electron-deficient compounds; and spectral and magnetic properties of transition metal compounds. *Prereq.* CHM 1383.
- CHM 1451 Experimental Inorganic Chemistry** **2 QH**
Presents topics in modern inorganic and organometallic chemistry. Introduces important experimental techniques. Lab fee. *Prereq.* CHM 1441 or taken concurrently.
- CHM 1461 Identification of Organic Compounds** **3 QH**
Examines qualitative analysis of organic compounds and mixtures, using physical, chemical, and instrumental methods. Lab fee. *Prereq.* CHM 1265 or CHM 1273.
- CHM 1491, CHM 1492 Directed Study** **2 QH each**
Offers independent work under the direction of a faculty member. *Prereq.* An organic chemistry sequence, and analytical chemistry and departmental approval.
- CHM 1521 Advanced Analytical Chemistry 1** **3 QH**
Examines analytical separations. Corresponds to CHM 3521. *Prereq.* CHM 1422 or equiv.
- CHM 1523 Advanced Analytical Chemistry 2** **3 QH**
Examines the theory, practice, instrumentation, and application of selected electroanalytical methods of analysis. Corresponds to graduate course CHM 3523. *Prereq.* CHM 1422 or equiv.
- CHM 1525 Advanced Analytical Chemistry 3** **3 QH**
Covers optical methods of analysis. Corresponds to CHM 3525. *Prereq.* CHM 1422 or equiv.

CHM 1561 Advanced Organic Chemistry 1	3 QH
Focuses on organic structure and reactions. Corresponds to graduate course CHM 3561. <i>Prereq.</i> CHM 1273 or CHM 1265.	
CHM 1562 Advanced Organic Chemistry 2	3 QH
Examines organic structure and reactions. Corresponds to graduate course CHM 3562. <i>Prereq.</i> CHM 1561.	
CHM 1563 Advanced Organic Chemistry 3	3 QH
Focuses on organic structure and properties. Corresponds to graduate course CHM 3563. <i>Prereq.</i> CHM 1562.	
CHM 1564 Spectrophotometric Identification of Organic Compounds	3 QH
Examines spectrophotometric identification of organic compounds. Corresponds to graduate course CHM 3564. <i>Prereq.</i> CHM 1273 or equiv.	
CHM 1581 Advanced Physical Chemistry 1	3 QH
Examines chemical thermodynamics. Corresponds to graduate course CHM 3581. <i>Prereq.</i> CHM 1383.	
CHM 1591 Advanced Physical Chemistry 2	3 QH
Focuses on atomic and molecular structure. Corresponds to graduate course CHM 3591. <i>Prereq.</i> CHM 1383.	
CHM 1738 General Chemistry Laboratory (Honors)	1 QH
Honors equivalent of CHM 1138.	
CHM 1741 General Chemistry 1 (Honors)	4 QH
Honors equivalent of CHM 1131.	
CHM 1742 General Chemistry 2 (Honors)	4 QH
Honors equivalent of CHM 1132.	
CHM 1751 General Chemistry 1 (Honors)	5 QH
Honors equivalent of CHM 1101.	
CHM 1752 General Chemistry 2 (Honors)	5 QH
Honors equivalent of CHM 1152.	
CHM 1800, CHM 1801, CHM 1802, CHM 1803, CHM 1804, CHM 1805 Undergraduate Research	4 QH each
Students may conduct original experimental work under the direction of a faculty member. A minimum of a two-quarter commitment and approval of the executive officer of the chemistry department are required. <i>Prereq.</i> <i>Middler year standing or above, chemistry major status, and a minimum QPA of 2.8 in courses required for the major.</i>	
CHM 1811 Advanced Chemical Laboratory Practice 1	4 QH
Staff members direct lab projects in analytical, inorganic, organic, and physical chemistry. Lab fee. <i>Prereq.</i> CHM 1273, CHM 1395, CHM 1396, CHM 1422, and departmental approval.	
CHM 1812 Advanced Chemical Laboratory Practice 2	4 QH
Students may continue lab projects from CHM 1811 or carry out new projects in different areas. Lab fee. <i>Prereq.</i> CHM 1811 and departmental approval.	
CHM 1840, CHM 1841, CHM 1842, CHM 1843 Junior/Senior Honors Project	4 QH each
For details contact the honors office.	

Communication Studies

CMN 1110 Voice and Articulation	4 QH
Provides training in developing clear and articulate speech. Includes topics such as the physiology of the vocal mechanism, voice projection and variety, articulation and pronunciation, and appropriate speech. Trains students through lectures, drills, and exercises.	
CMN 1111 Oral Interpretation of Literature	4 QH
Teaches the theory and skill of dramatic reading, with an emphasis on analyzing and presenting literature orally. Analyzes prose, poetry, and dramatic selections to communicate the author's meaning through voice, tone, and gesture.	
CMN 1115 Foundations of Communications	4 QH
Explores the history and nature of human interaction through speech. Includes such topics as the communication process; verbal and nonverbal; interpersonal, group, and public communication contexts; communication ethics; and the mass communication media. Offers the opportunity to learn principles governing effective communication.	
CMN 1116 Public Speaking	4 QH
Develops skills in public communication. Includes topics such as choosing and researching a topic, organizing and delivering a speech, handling speech anxiety, listening critically, and adapting language to an audience. Offers the opportunity for students to present a series of speeches and receive advice and criticism from an audience.	
CMN 1210 Advanced Voice and Articulation	4 QH
Develops the vocal techniques introduced in CMN 1110. Includes work with speech patterns and dialects. Develops the professional speaking voice through exercises and applying concepts. <i>Prereq.</i> CMN 1110.	
CMN 1211 Advanced Oral Interpretation	4 QH
Provides an in-depth study of analyzing and performing literature. Includes topics such as classical literature, group performance of literature, and programming. <i>Prereq.</i> CMN 1111.	
CMN 1232 Communication and Gender	4 QH
Reviews contemporary research in gender, specifically the role that gender plays in human communication. Includes topics such as "genderlect," gender bias in language, and gender images communicated in the media.	
CMN 1239 Argumentation and Debate	4 QH
Introduces the principles and skills of effective argument. Includes topics such as the process of advocacy, developing an argument through reasoning, the psychology of argument, and motivational techniques of argumentation. Combines theory and practice in argument through individual presentations and team debates. <i>Prereq.</i> CMN 1116 or permission of instructor.	
CMN 1240 Advanced Studies in Speech Performance	4 QH
Provides an opportunity to develop skills and strategies necessary to compete successfully on the forensics circuit. Designed for students in the forensics program. <i>Prereq.</i> Permission of instructor.	

- CMN 1250 Introduction to Mass Communication** 4 QH
Surveys the various media of communication. Includes radio, television, film, newspapers, magazines, and electronic communication. Explores the impact media have on society.
- CMN 1300 Communication Theory** 4 QH
Surveys significant theories of human communication. Emphasizes such topics as systems theory, symbolic interaction theory, structuralist theories, and critical-cultural studies.
- CMN 1310 The Classical Age of Speech and Rhetoric** 4 QH
Surveys theories of persuasive speech in ancient Greece and Rome. Includes Aristotle's rhetoric, Sophistic traditions, the rhetoric of Cicero and Quintilian, and famous speeches of the Golden Age of Athens. Teaches the roots of the discipline of speech and communication.
- CMN 1315 Theories of Persuasion** 4 QH
Examines the behavioral theories used to create or modify beliefs, attitudes, and values. Studies how professional persuaders conceive of and execute arguments for specific audiences.
- CMN 1317 The Audience in Mass Communication** 4 QH
Explores how mass media audiences interpret and actively use media messages and products as listeners, readers, and consumers. Examines the different stages of ethnographic research, audience meanings and interpretations, pleasure and fandom, the role of media in everyday life, and the use of ethnographic research methods in communications studies. *Prereq.* CMN 1250.
- CMN 1318 Negotiation Skills** 4 QH
Focuses on the process of negotiating mutually acceptable agreements in adversarial settings. Emphasizes collective bargaining as a form of problem solving, and resolving conflict through mediation. *Prereq.* Middled standing or above or permission of instructor.
- CMN 1330 Interpersonal Communication** 4 QH
Helps students improve their interpersonal communications skills. Includes topics such as the self in communication, self-disclosure, language, nonverbal communication, listening skills, conflict resolution, and maintaining functional relationships through communication.
- CMN 1331 Advanced Interpersonal Communication** 4 QH
Continues instruction in interpersonal communication. Focuses on applying principles of effective communication to human relationships. *Prereq.* CMN 1330.
- CMN 1338 Group Discussion** 4 QH
Develops skills in working with and in small groups. Instructs in the small group decision-making process as well as in the interpersonal dynamics of the group. Includes topics such as problem solving, conflict resolution, role playing, and leadership.
- CMN 1410 Contemporary Public Address** 4 QH
Analyzes significant public speeches from the recent past. Gives an opportunity to appreciate the role of oratory in major political and social movements by studying audio and videotapes of historic and influential speakers. Uses various critical theories to develop skills in criticism.
- CMN 1415 Persuasion in Contemporary Culture** 4 QH
Develops students' critical thinking skills as receivers of persuasive communication. Examines instances of persuasion in popular culture such as advertising, mass media, and politics. Helps students become more informed, critical receivers of mediated messages. *Prereq.* CMN 1315 or permission of instructor.
- CMN 1430 Organizational Communication** 4 QH
Surveys the communication process in complex organizations. Includes topics such as the evolution of organizational communication, communication networks, information management, and communication climate. Analyzes case studies and teaches how to improve the quality of communication in an organization. *Prereq.* CMN 1330 or permission of instructor.
- CMN 1431 Advanced Organizational Communication** 4 QH
Examines the problems of sending and receiving information in complex organizations. Reviews technologies used to disseminate information, communication auditing processes, and methods to devise and assess communication programs for organizations. *Prereq.* CMN 1430.
- CMN 1437 Consultation Skills** 4 QH
Surveys techniques used to analyze communication problems in industry, organizations, and groups. Includes theory and practice using the case study methods. Offers students the opportunity to learn how to audit an organization, identify problems in communication, and suggest solutions. *Prereq.* CMN 1115, CMN 1300, CMN 1330, and CMN 1338.
- CMN 1450 Television Studio Production** 4 QH
Introduces studio production techniques. Covers the creative and technical elements of video production, camera operation, floor direction, editing graphics, lighting, picture composition, and directing methods. *Prereq.* CMN 1250 or permission of instructor.
- CMN 1451 Foundations of Broadcast Technology** 4 QH
Surveys the history of radio and television broadcasting technology in the United States and around the world. Includes the evolution of technology, broadcast television versus cable and pay-per-view, effects of technology on the media, and the future of broadcast technology. Develops an understanding and appreciation of broadcast technology's impact on contemporary society.
- CMN 1452 Radio Production** 4 QH
Introduces the principles and practices of radio. Includes lab work in studio production and instruction in program design, ratings, and on-air performance. Gives students an opportunity to produce broadcast material such as feature stories, commercials, and public service announcements. *Prereq.* CMN 1250 or permission of instructor.
- CMN 1453 Broadcast Management** 4 QH
Examines the four critical functions of media management: economics, marketing, advertising, and ratings. Includes FCC regulatory policies, external market forces, and internal management forces. *Prereq.* CMN 1250 and middler standing or above.
- CMN 1454 Programming for Radio and Television** 4 QH
Examines the history of radio and television programming and the structure in which programming operates. Covers network, network affiliate, independent, cable, and public television and radio, and the major suppliers of programs such as Hollywood studios, independent producers, syndicates, networks, and local stations. Reviews how the practical components of the program

marketplace, such as rating, scheduling, regulation, and advertising, developed historically. Includes an opportunity to design a music wheel for radio and a short video segment for television.

CMN 1455 Television Field Production 4 QH

Offers advanced training in video production techniques, emphasizing remote location shooting. Includes location scouting, production budgets, writing techniques, equipment location, post-production editing, and content analysis. Offers the opportunity to work in teams to produce and direct television using remote video equipment. *Prereq.* CMN 1250 and CMN 1450.

CMN 1500 Special Topics in Communication Studies 4 QH

Examines various contemporary issues in communication studies. Course content to be posted in communication studies department prior to quarter in which it is offered. *Please consult prior to registering.*

CMN 1554 Special Topics in Media 4 QH

Examines various contemporary issues in mass media.

CMN 1555 Communication and the Quality of Life 4 QH

Exposes students to the role that communication plays in the quality of individual and community life. Helps students explore the impact of contemporary communication trends. Analyzes the impact of various media on quality of life. *Prereq.* Middler standing, CMN 1330, or permission of instructor.

CMN 1600 Introduction to Communication Research 4 QH

Introduces the various methods through which scholars of communication develop knowledge. Includes historical, descriptive, experimental, and ethnographic methods. Expects student to engage in individual research projects designed to increase familiarity with communication literature and to develop skills in critical writing and library research. *Prereq.* CMN 1300 or permission of instructor.

CMN 1610 Rhetorical Criticism 4 QH

Offers a critical analysis of a range of rhetorical texts: visual, literary, oral, and musical. Includes traditional and cultural approaches to criticism. (V)

CMN 1800, CMN 1801, CMN 1802, CMN 1803 4 QH each
Junior/Senior Honors Project

For details contact the honors office.

CMN 1890, CMN 1891, CMN 1892 Directed Study 4 QH each

Prereq. Permission of instructor.

CMN 1893 Directed Study 1 QH

Prereq. Permission of instructor.

CMN 1894 Directed Study 2 QH

Prereq. Permission of instructor.

CMN 1895 Internship in Speech Communication 4 QH

Gives students the opportunity to gain hands-on experience in the communications industry. Requires prior approval by the internship director prior to registration. Further internship details are available in the department office.

Economics

Unless otherwise stated, there are no prerequisites for advanced economics courses. Where prerequisites are indicated, exceptions may be granted with the instructor's permission.

ECN 1001 Economic Problems and Perspectives 4 QH

Studies the economic concepts and methods that are useful to an informed citizen for an understanding of modern social issues such as unemployment, inflation, poverty, crime, the environment, medical care, and international competitiveness. *Limited to students who have not taken ECN 1115 or ECN 1116. Cannot be used to meet any departmental requirement of the major.*

ECN 1115 Principles of Macroeconomics 4 QH

Introduces macroeconomic analysis. Topics include the flow of national income, economic growth and fluctuation, the role of money and banking, and monetary and fiscal policies. Emphasizes the development of conceptual tools to analyze the economic problems facing modern society. (II)

ECN 1116 Principles of Microeconomics 4 QH

Focuses on development of basic theory of demand, supply, and market price. Explores applications to selected microeconomic problems, such as basic monopoly and competition, and other issues that relate to the role of the pricing system in resource allocation and income distribution. (II)

ECN 1130 Medical Economics 4 QH

Examines health-care trends in the United States and selected foreign countries, causes of the rising costs of medical care, the particular nature of the demand for health-care services, the demand for physicians and paramedical personnel, Certificate of Need committees, health maintenance organizations, medical malpractice, increases in life expectancy and its impact on society, third-party payers, and the true cost of medical education.

ECN 1140 Economics of Crime 4 QH

Covers economic analysis of crime and the criminal justice system. Topics include theoretical and empirical analysis of the economic causes of criminal behavior, the social costs of crime and its prevention, and design of enforcement policies.

ECN 1150 Economics of World Energy and Primary Resources 4 QH

Investigates economic, political, and historical backgrounds of energy and other resources problems. Analyzes future impact of primary resources limitations on United States and world economics as well as feasibility studies of resource substitution. *Prereq.* ECN 1115 and ECN 1116.

ECN 1170 Economic Issues In Minority Communities 4 QH

Examines the economic conditions of nonwhite minorities within the United States economy. Includes historical and cultural materials as well as specific theoretical and empirical analysis of the economic problems confronting minority communities. Same as AFR 1161. (VI)

ECN 1215 Macroeconomic Theory 4 QH

Investigates the conceptual and empirical problems of creating and using national accounts, price index problems, conceptual and empirical evaluation of consumption and investment functions and their policy implications, multiplier and accelerator models, and recent cyclical fluctuations. Analyzes theories of

inflation, unemployment, and growth in the light of recent economic history. *Prereq.* ECN 1115, and MTH 1114 or equiv.

ECN 1216 Microeconomic Theory 4 QH
Examines supply-and-demand analysis, various elasticity concepts and applications, theories of demand and production, and derivation of cost curves. Analyzes pricing and output behavior in the several market structures with their welfare implications and the pricing of resources. *Prereq.* ECN 1116, and MTH 1114 or equiv.

ECN 1250 Statistics 1 4 QH
Discusses elementary set theory, basic probability, measurement and presentation of economic statistics, descriptive statistics, basic estimation techniques, testing statistical hypotheses, and sampling problems. *Economics majors who have earned credit for ECN 1250 may not receive credit for MSC 1200 or MTH 1152.*

ECN 1251 Statistics 2 4 QH
Studies analysis of variance, correlation and linear regression analysis, multivariate regression analysis, and Bayesian decision making. *Prereq.* ECN 1250. *Economics majors who have earned credit for ECN 1251 may not receive credit for MSC 1201.*

ECN 1310 Labor Economics 4 QH
Focuses on economic analysis of the labor market and the labor force. Topics include the supply, development and efficient use of human resources; wage determination; the changing occupational and industrial structure; causes, nature and incidence of unemployment; the economic impact of unions, related labor market institutions and relevant public policies. *Prereq.* ECN 1116 or ECN 1115.

ECN 1311 Employment and Training Programs and Policies 4 QH
Examines the nature and objectives of employment and training programs, the nature and causes of human resource problems, current and previous efforts to solve human resource problems in the United States, planning of human resource programs, and economic evaluation of employment and training programs. *Prereq.* ECN 1115.

ECN 1312 Women in the Labor Market 4 QH
Focuses on economic analysis of the labor market position of women in the context of the changing economic structure and labor market institutions. Analyzes female labor force participation differences; male/female differentials in earnings and unemployment; occupational concentration, occupational segregation, theories and evidence of sex discrimination; and new opportunities for women. *Prereq.* ECN 1115 and ECN 1116.

ECN 1314 Economics of Education and Human Capital 4 QH
Explores theoretical and empirical treatment of economic issues related to education and job training, including formal education (preschool through post-secondary), vocational education, on-the-job training, and government-sponsored employment and training programs. Emphasizes follow-up studies, cost-effectiveness analysis, and benefit-cost analysis for determining the effectiveness of education and training investments from a private and social standpoint. *Prereq.* ECN 1116.

ECN 1315 Income Inequalities and Discrimination 4 QH
Focuses on economic analysis of income inequalities, poverty, and discrimination. Examines the causes of income inequality and the nature, causes and effects of poverty; economics of racial discrimination; and public welfare system and other income maintenance schemes. *Prereq.* ECN 1115 or ECN 1116.

ECN 1320 Urban Economics 4 QH
Studies urban growth and development, intermetropolitan location of business firms, regional shifts in economic activity, intrametropolitan location of firms and households, and land use patterns. *Prereq.* ECN 1116.

ECN 1321 Urban Economic Problems and Policies 4 QH
Continues ECN 1320 but may be taken separately. Focuses on economic analysis of selected urban problems such as housing, poverty, transportation, education, health, crime, and the urban environment. Discusses public policies relating to such problems. *Prereq.* ECN 1116.

ECN 1322 Economics of Transportation 4 QH
Covers transportation and land-use patterns; externalities; social costs and social benefits of various modes of transportation, ownership, regulations, and financing of various modes of transportation; and economics of new technology in transportation. *Prereq.* ECN 1116.

ECN 1323 Environmental Economics 4 QH
Applies the tools of economics to environmental issues. Explores taxonomy of environmental effects; externalities; the commons problem; taxation, regulations, marketable permits, and property rights as a solution; measuring benefits of cleaner air and water, noise abatement, and recreational areas; global issues including tropical deforestation and acid rain; the relevance of economics to the environmental debate. *Prereq.* ECN 1116.

ECN 1330 Development Economics 4 QH
Explores prospects for economic growth and development in poor nations as indicated by economic analysis and historical experience; social, cultural, and institutional determinants of growth; analysis of agriculture and development, the role of technological change, population; and foreign trade. (V)

ECN 1331 American Economic Development 4 QH
Studies economic development of the United States from the colonial period to the present, historical changes in economic institutions and technologies, with special attention to preconditions of industrialism; the American Industrial Revolution, its spread and socioeconomic consequences; the Great Depression and the subsequent rise of mixed economy and welfare state; and United States adjustments to postwar economic changes.

ECN 1332 Economic History of Less Developed Countries 4 QH
Considers the problems of initiating and sustaining economic development in selected Third World countries during the last two hundred years. Country-specific case studies cover the role of traditional economic structures, different development goals and strategies, state policies, and international economic relations. *Prereq.* ECN 1115 and ECN 1116; ECN 1330 recommended.

ECN 1333 European Economic Development 4 QH
Discusses economic inheritance of the nineteenth century development of capitalism and laissez-faire; the aftermath of the Industrial Revolution, European overseas expansion, the world wars, and the dissolution of empires; American economic conquest and European integration; the future of less developed areas in southern Europe; environmental impact of industrialism and the implications of technological society. (III)

ECN 1334 Comparative Economics**4 QH**

Emphasizes competing types of theoretical economic systems; analysis of organization and operation of currently existing types of communist, socialist, and capitalist economies; comparison and evaluation of economic behavior and performance of different economic systems. *Prereq.* ECN 1115 and ECN 1116.

ECN 1335 International Economics: Finance**4 QH**

Introduces the workings of foreign exchange markets, balance of payments, fiscal and monetary policy in an open economy under different exchange rate regimes, international capital movements, and the international monetary system. *Prereq.* ECN 1115 or permission of instructor.

ECN 1336 International Economics: Trade**4QH**

Examines trade theories and patterns, impact of trade on domestic factor prices, factor movements, and terms of trade. Explores welfare implications and political economy of alternative trade policies, such as free trade, tariffs, quotas, and custom unions. *Prereq.* ECN 1116 or permission of instructor.

ECN 1337 History of Economic Thought**4 QH**

Traces the evolution of Western economic thought. Covers several important schools in economics, examining the questions economists raise and analytical methods they use to study human behavior. *Prereq.* ECN 1115 and ECN 1116.

ECN 1340 Government Expenditures: Structure and Evaluation**4 QH**

Covers fiscal functions of government, fiscal institutions and politics, theory of social goods, public expenditure growth and structure, federal budget expenditure evaluation and cost-benefit case studies, fiscal federalism in theory and practice, and issues of public debt and deficit. *Prereq.* ECN 1116 or equiv.

ECN 1341 Financing of Government: Taxation and Debt**4 QH**

Considers principles of taxation; problems of tax structure and reform at federal, state, and local levels; tax incidence; effects of taxation on economic efficiency and growth; negative income tax and social security finance; issues of public debt and deficit. *Prereq.* ECN 1116 or equiv.

ECN 1342 Money and Banking**4 QH**

Studies the nature and the functions of money, credit, and the role of financial organizations in the United States economy. Emphasizes theories of banking, money supply, and monetary policy. *Prereq.* ECN 1115 or equiv.

ECN 1345 Business Cycles and Inflation**4 QH**

Considers the theories of business cycles and inflation and an empirical application of these theories to current business cycle, inflation, and stagflation problems. *Prereq.* ECN 1115, ECN 1116, and ECN 1215.

ECN 1350 Introduction to Econometrics**4 QH**

Presents an introduction to the methods of econometric analysis and forecasting. Covers ordinary least squares, piecewise regression, tests and corrections for serial correlation and heteroskedasticity, specification analysis, simultaneous equations systems, errors in variables, dynamic models and elementary forecasting. *Prereq.* ECN 1115, ECN 1116, and ECN 1251.

ECN 1351 Problems in Economic Research**4 QH**

Examines research methods used by practicing economists. Discusses typical problems from applied areas of economics,

including choice of modeling framework, problems of data collection, review of estimation techniques, interpretation of results, and development of static and dynamic adaptive policy models. *Prereq.* ECN 1115, ECN 1116, and ECN 1251.

ECN 1353 Introduction to Mathematics for Economists**4 QH**

Introduces basic tools of mathematics, matrix algebra, differential and integral calculus and classical optimization, with special reference to economic applications. *Prereq.* ECN 1115 and ECN 1116.

ECN 1360 Managerial Economics**4 QH**

Explores the application of economic principles and theory, by the use of case studies, to the solution of decision-making problems in such areas as demand forecasting, price policies, estimation and control of costs, financing of capital investments, and responses to government taxation and regulation policies. *Prereq.* ECN 1116.

ECN 1361 Social Control of Economic Activities**4 QH**

Focuses on the development of the government's role in economic activities, examining the relationships between the government and industry, labor, agriculture, public utilities, and consumers. Traces the changing role of the government from a laissez-faire policy to one of direct intervention in the economy. Covers such topics as wage and price control, environment and antipollution policies, consumer protection, and conglomerate mergers.

ECN 1362 Industrial Organization and Public Policy**4 QH**

Presents an analytic framework and empirical study of how the structure of industrial organization and conduct of sellers and buyers affects economic performance and welfare. Includes industrial examples and case studies. Examines antitrust as a public policy designed to promote better market performances. *Prereq.* ECN 1116.

ECN 1401 Advanced Economic Theory**4 QH**

Covers advanced theoretical treatment of selected topics in micro- and macroeconomics. Recommended for students planning to take graduate economics. *Prereq.* ECN 1215 and ECN 1216.

ECN 1415 Selected Topics in Macroeconomics**4 QH**

Studies macroeconomic issues. *Prereq.* Permission of instructor.

ECN 1416 Selected Topics in Microeconomics**4 QH**

Studies microeconomic issues. *Prereq.* Permission of instructor.

ECN 1481 Directed Study**1 QH**

Offers independent work on a chosen topic under the direction of a faculty member of the department. Should not be substituted for the course requirements leading to a BA or BS degree in economics. Up to four quarter hours per offering, with an eight quarter-hour maximum. *Prereq.* Qualified senior economics majors and approval of department chair.

ECN 1482 Directed Study**2 QH**

Offers independent work on a chosen topic under the direction of a faculty member of the department. Should not be substituted for the course requirements leading to a BA or BS degree in economics. Up to four quarter hours per offering, with an eight quarter-hour maximum. *Prereq.* Qualified senior economics majors and approval of department chair.

ECN 1483 Directed Study**3 QH**

Offers independent work on a chosen topic under the direction of a faculty member of the department. Should not be substituted for the course requirements leading to a BA or BS degree in economics. Up to four quarter hours per offering, with an eight quarter-hour maximum. *Prereq.* *Qualified senior economics majors and approval of department chair.*

ECN 1484 Directed Study**4 QH**

Offers independent work on a chosen topic under the direction of a faculty member of the department. Should not be substituted for the course requirements leading to a BA or BS degree in economics. Up to four quarter hours per offering, with an eight quarter-hour maximum. *Prereq.* *Qualified senior economics majors and approval of department chair.*

ECN 1492 Senior Economics Seminar**4 QH**

Coordinates and applies economic concepts, methodology, and data to issues and problems of broad social, economic, and philosophical importance. *Prereq.* *ECN 1216 and ECN 1215; senior economics majors only.*

ECN 1495, ECN 1496, ECN 1497, ECN 1498**4 QH each****Junior/Senior Honors Project**

For details contact the honors office.

ECN 1715 Macroeconomics Principles (Honors)**4 QH**

Honors equivalent of ECN 1115.

ECN 1716 Microeconomics Principles (Honors)**4 QH**

Honors equivalent of ECN 1116.

Education

ED 1003 Reading/Study Skills 1**4 QH**

Provides instruction to students who demonstrate a need to be more efficient in comprehending and studying college textbooks and collateral reading assignments. Concentrates on techniques involved in understanding informative materials and introduces the evaluation of persuasive prose. In addition, presents suggestions on such topics as how to listen to and take summary notes on course lectures and how to set study goals and priorities consistent with course objectives.

ED 1004 Reading/Study Skills 2**4 QH**

Continues topics introduced in ED 1003 and expands upon the analysis and interpretation of persuasive texts. Emphasizes reading imaginative prose for meaning and pleasure, preparing for and taking examinations, and learning to adjust reading speed and method to various materials encountered in concurrent courses.

ED 1005 Practicum in Reading and Study Skills**4 QH**

Gives students in the academic program Project Ujima comprehensive tools to help them to master the how-to's of reading textbooks, notetaking, outlining, introductory research skills, time management, studying skills, and other techniques necessary for success in college.

ED 1100 Human Services and Social Science**4 QH**

Draws on anthropology, psychology, and sociology, and some of the concepts, methods, and terminology of those fields. Concentrates on the evolution of human nature, the influence of previous experience and learning on the behavior of individuals

and groups, the difficulties in achieving a full degree of humanity in a technological society, and the potentially powerful roles that "professional socializers" (teachers, clinicians, group leaders, and so forth) can play in the lives of students and clients.

ED 1101 Education for the Future**4 QH**

Discusses human survival and continued development as problems of educating people to use their skills and abilities to live harmoniously. Examines the teaching and learning process used to transmit information and values from one generation to the next, and places these processes in the context of the past, present, and future of the American family and education. Approaches these issues with a creative and humanistic perspective.

ED 1102 Child Development, Learning and Education**4 QH**

Surveys developmental processes from the prenatal period through preadolescence. Covers principles of physical, cognitive, language, social, and personality development and discusses the implications for childrearing and schooling.

ED 1103 Adolescent Development, Learning and Education**4 QH**

Presents a basic overview of the continuity of human development in contemporary society, from the pre-adolescent period through adolescence, adulthood, middle age, and old age. Considers significant areas of growth, development, and adjustment for each period, including social, sexual, personality, motivational, and cognitive aspects.

ED 1104 Analysis of the Instructional Process**4 QH**

Examines conflicting theories about the nature of teaching and learning. Evaluates the effects of traditional and innovative educational systems on learners. Identifies educational tools for describing, analyzing, and evaluating aspects of learning and teaching; refines students' use of those tools during sequential field observations and class meetings. Requires fieldwork.

ED 1105 Day Care and Nursery Schools: Social and Cultural Origins**4 QH**

Explores the origins of the increased contemporary use of out-of-the-family child care arrangements in the United States and in selected European and third-world nations. Covers the interrelation of industrialization, technology, and family functioning; contrasting varieties of child care centers in operation today; and effects of the proliferation of child care centers on other aspects of society, such as neighborhood life, business, parents' life-styles, elementary school curricula, government spending, and the job market in education and human services. Requires three to four hours per week of fieldwork in child care. *Prereq.* *ED 1100 or equiv.*

ED 1106 Creative Expression in Children**4 QH**

Assists students who are interested in working with children in a variety of settings. Focuses on the potential of creative expression in interpersonal communication and the relation of children's creative experiences to their cognitive, emotional, and social development. Provides the opportunity to acquire the hands-on experience and confidence to work with various media available for creative expression. *Prereq.* *ED 1102.*

ED 1300 Education and Psychosocial Development**4 QH**

Examines theories and research on the socialization functions of education. Covers the relative influence of early versus post-childhood socialization and the role of diverse educational experiences and institutions in personality development. *Prereq.* *ED 1100 or equiv.*

ED 1302 The Human Services Professions**4 QH**

Explores what a human service agency is, how it comes into being, how it grows and changes. Analyzes attitudes, values, skills, and knowledge of the human services worker and the reasons why people in modern society require human services assistance. Views human services from the eyes of clients as well as society as a whole. Requires fieldwork in a human service agency as well as a good deal of independent study. Required for all human services majors; open to other students on space-available basis. *Prereq.* ED 1100, SOC 1100, or equiv.

ED 1306 Measurement and Evaluation**4 QH**

Emphasizes evaluation techniques for use in the classroom and teaching-learning situations at all levels. Explores the importance of establishing behavioral objectives as a basis for evaluation. Places considerable emphasis on improving teacher-made tests, especially objective-type tests. Requires students to construct an objective test in their discipline for an instructional unit. Also reviews other evaluation techniques besides tests. Gives brief attention to standardized measurement instruments of ability and achievement as they may be used in the evaluation of pupil progress. *Prereq.* ED 1104 and ED 1106.

ED 1309 Intervention Strategies for the Human Services**4 QH**

Introduces the range of skills used in working with clients in the various helping professions such as counseling (individual and group), advocacy, rehabilitation, community organizing, and income maintenance. Utilizes role playing, simulations, and interviews with practicing professionals. Requires reading but not fieldwork. Intended as preparation for more specialized courses; required for human services majors but open to other students with appropriate backgrounds.

ED 1311 Case Management: Diagnosis and Treatment**4 QH**

Introduces the basic theory and skills of managing clients' treatment programs in a variety of institutional settings. Provides training in identifying the components of a psychosocial assessment. Examines common techniques of planned service delivery and resource coordination and reviews the entitlements available to clients of diverse needs and backgrounds. *Prereq.* PSY 1111 or SOC 1100.

ED 1318 Seminar in Early Childhood Development**4 QH**

Focuses on views of cognitive, personality, and social development during early childhood. Discusses the implications of these views. Requires each student to carry out a project in the field placement and report results to the seminar. *Prereq.* ED 1102.

ED 1319 Speech, Language, and Cognition in the Young Child**4 QH**

Provides an overview of normal speech and language development and its relationship to cognition in the young child. Describes speech-language and cognitive behaviors in a variety of disordered populations and outlines a team approach to treating such disorders. Uses a variety of case studies to describe the assessment and remediation of young children with speech and language disorders in the classroom. Team taught by faculty from the Department of Education and from the Department of Speech-Language Pathology and Audiology. Provides students an opportunity to understand the implications of disordered speech and language for classroom learning. *Prereq.* ED 1102.

ED 1405 Literature and Learning Materials for Children and Young Adults**4 QH**

Offers a comprehensive survey of the field of children's literature and literature for young adults. Although designed specifically for

prospective teachers (and required of all Early Childhood and Elementary Education majors), may also be taken as an elective by all students. Surveys and evaluates examples of contemporary children's literature and other learning materials used in preschool, elementary, secondary, and remedial programs. Covers such recurring themes as racism and sexism in children's books, controversial books for young children, contemporary illustrators, and banned books.

ED 1406 Elementary Education Curriculum 1**4 QH**

Examines rationales for major curriculum movements in elementary education, emphasizing what current research predicts as reasonable directions to follow. Engages students in different but complementary experiences to demonstrate that an array of teaching strategies enables children to learn in ways compatible for them. Gives particular attention to using sensory approaches via visual art, music, and movement as a basis for integrated program design in all subject areas. Stresses the nature of the thinking processes underlying the activities, and ways to sensitize children to these processes. Team taught by specialists in the arts and a specialist in curriculum. *Prereq.* ED 1104.

ED 1407 Elementary Education Curriculum 2**4 QH**

Describes and evaluates social studies curricula in use in elementary school. Develops criteria to select appropriate social studies content, skills, and attitudinal objectives. Expects students to use these criteria to develop social studies experiences that meet the developmental needs of learners and to shed light on the lives of individuals and groups within different cultural settings. *Prereq.* ED 1406.

ED 1410 Methods and Materials for Teaching Adolescents and Adults 1**4 QH**

Considers specific methods and materials appropriate to teaching adolescents and adults. Seeks to develop in the students an understanding of the complexities of the materials and methodology of the teaching-learning process, to encourage within students attitudes conducive to and identified with good tenets of teaching, and to foster in the students acceptance of the need to grow constantly and to be aware of the continuing development of the learning-teaching process. Requires fieldwork. *Prereq.* ED 1104.

ED 1411 Methods and Materials for Teaching Adolescents and Adults 2**4 QH**

Focuses on the various subject areas of teaching techniques of organizing and presenting lessons, developing teaching materials, using audiovisual equipment, developing and implementing evaluation instruments, and selecting appropriate materials within the field of interest. Requires fieldwork. *Prereq.* ED 1410.

ED 1412 Fundamentals of Curriculum Development**4 QH**

Examines how goals and objectives are selected and priorities are determined. Analyzes methods for designing educational programs to meet specified goals, methods of evaluating educational outcomes in terms of the goals of the program, and techniques for modifying programs in the light of such performance.

ED 1414 Current Issues in Teaching the Gifted and Talented**4 QH**

Examines issues that affect the type and quality of education available to the gifted and talented in the United States. Describes and evaluates various approaches and programs and reaches conclusions about their effectiveness. Examines research findings on the needs of this segment of the population of learners in order to provide some criteria for future curriculum development.

ED 1417 Student Teaching Practicum and Seminar 8 QH

Allows for full-time participation in a University-arranged and supervised school program designed to analyze learning and teaching and to demonstrate, evaluate, and develop teaching skills. *Prereq.* Advanced professional sequence with minimum 2.5 QPA and C- in each certification course.

ED 1423 Multicultural Education 4 QH

Reviews aspects of the history and culture of different ethnic groups to explore the manner in which certain themes and issues are manifested. Examines and evaluates ethnic and multicultural school curricula in relation to specific educational criteria and goals and their potential impact on learners. Requires students to select and organize historical, literary, and artifact materials from specific ethnic groups and to use them in the planning of learning experiences for classroom use.

ED 1425 Elementary School Mathematics and Science 4 QH

Focuses on methods and materials of mathematics and science teaching for early childhood and elementary education majors. Provides the opportunity for university students to explore various strategies and materials of teaching mathematics and some content areas in science. Takes into account the development stages of children.

ED 1426 Fundamentals of Reading 4 QH

Introduces developmental reading for prospective early childhood and elementary teachers. Studies beginning reading, word recognition, comprehension, and study skills. Introduces materials of instruction, methods of teaching, testing, and grouping.

ED 1800 Directed Study 1 4 QH

This experience is provided for the student whose unique academic needs or interests cannot be adequately satisfied in any of the scheduled courses of the department. Preparation consists of approval of the supervising faculty member and the dean's office. Approval forms must be submitted to the dean's office during the quarter prior to registration for the directed study. *Prereq.* Permission of instructor.

ED 1801 Directed Study 2 4 QH

For students who have completed ED 1800.

English

Unless otherwise indicated, the prerequisite for upperclass courses is a freshman English sequence. For undergraduate students in the full-time day programs this means ENG 1110 and ENG 1111; ENG 1013, ENG 1014, and ENG 1111; ENG 1110, ENG 1014, and ENG 1111. For the College of Engineering, ENG 1111 and ENG 1113, and for international students, ENG 1004, ENG 1005, and ENG 1006.

ENG 1001 Intensive English as a Second Language 0 QH

Reviews English grammar to help non-native speakers to develop listening, speaking, reading, writing, and studying skills. Includes language lab and small-group tutorials.

ENG 1004 Fundamentals of English for Non-Native Speakers 4 QH

Provides intensive practice in composition with accent on accurate, intelligible writing and paragraphs organized around single, well-supported ideas. Encourages sentence-combining and vocabulary

development, and gives special attention to individual writing needs. Includes prose readings, class discussion, and selective review of grammar. *Prereq.* Special placement for non-native speakers whose performance or scores indicate that their writing skills are not yet up to those required for ENG 1005.

ENG 1005 English for International Students 1 4 QH

Emphasizes the development of skills needed in writing clear, expository prose essays. Requires the regular writing and rewriting of essays of increasing length and complexity. Focuses on appropriate prose readings for discussion and analysis and introduces techniques preparatory to research writing. *Prereq.* ENG 1004 or special placement.

ENG 1006 English for International Students 2 4 QH

Introduces the study of literature through close reading and discussion of fiction, nonfiction, and poetry. Advances development of rhetorical techniques by requiring frequent essays written in relation to the readings and rewritten to improve content, organization, and diction. Provides guided experience with using outside sources and library materials for writing a term paper. *Prereq.* ENG 1005 or equiv.

ENG 1013 Fundamentals of English 1 4 QH

Offers an introduction to principles of the writing process. Emphasizes individualized assistance in generating and developing ideas, drafting, revising, and organizing and mastering the conventions of written English. *Prereq.* Special placement.

ENG 1014 Fundamentals of English 2 4 QH

Continues instruction in writing, emphasizing exposition, argument, and academic essay writing, as well as the conventions of English usage, punctuation, and syntax. Individualized assistance in invention, drafting, revision, and editing. *Prereq.* ENG 1013 or ENG 1110.

ENG 1110 Freshman English 1 4 QH

Focuses on the individual student's writing skills. Includes application of important principles of composing, logic, and rhetoric to exposition and argumentation. Reviews sentence structure, punctuation, and paragraphing. Analyzes essay forms and problems. Students receiving a grade of S must take ENG 1014.

ENG 1111 Freshman English 2 4 QH

Continues instruction in writing, with emphasis on expository methods of defining, describing, analyzing, persuading, and composing the research paper. Requires students to write lengthy critical essays based on consideration of primary and secondary materials. Focuses on poems, stories, and plays as the subject matter for discussion of writing technique and written assignments. ENG 1111 follows ENG 1110 and is required of all freshmen in the University. *Prereq.* ENG 1110 or ENG 1014.

ENG 1113 Great Themes in Literature 4 QH

Explores a theme in literature through a number of illustrative works from the past and the present. Develops techniques of research and documentation. *Prereq.* Engineering majors only.

ENG 1115 Poetry 4 QH

Involves close reading of selected poems, study of critical terms, and practice in different critical approaches to poetry; examines techniques for reading a variety of poetic texts. (II) *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1116 Fiction	4 QH	ENG 1126 Backgrounds in English and American Literature	4 QH
Involves close reading of selected novels and short stories, study of critical terms, and practice in different critical approaches to fiction. (II) <i>Prereq.</i> ENG 1110 and ENG 1111 or equivalent.		Examines in translation Greek, Roman, and biblical literature as background for literary study. Emphasizes the development of myth, genre, and theme. Readings include Homer, Virgil, Ovid, the most influential parts of the Bible, and Dante. (III) <i>Prereq.</i> ENG 1110 and ENG 1111 or equivalent.	
ENG 1117 Drama	4 QH	ENG 1275 Grammar for Journalists	4 QH
Involves close reading of selected plays, study of critical terms, and practice in different critical approaches to drama. (II) <i>Prereq.</i> ENG 1110 and ENG 1111 or equivalent.		Reviews the mechanics of newspaper and magazine prose. Emphasizes grammatical forms, punctuation, spelling, effective structures, and conventional usage. <i>Prereq.</i> Journalism majors only.	
ENG 1118 Introduction to Language and Linguistics	4 QH	ENG 1276 Science Fiction	4 QH
Introduces students to their unconscious linguistic knowledge about sentence structure (syntax), meaning (semantics), word forms (morphology), and speech sounds (phonology). Examines other issues related to language such as the Black English/Standard English debate, women's and men's language, "talking" chimpanzees, "talking" computers, and the nature/nurture controversy. (II) <i>Prereq.</i> ENG 1110 and ENG 1111 or equivalent.		Traces the development of various science fiction themes and approaches, from early man versus machine and love/hate relationships to alien close encounters of all kinds. From <i>Frankenstein</i> to most recent titles. <i>Prereq.</i> ENG 1110 and ENG 1111 or equivalent.	
ENG 1119 History of the English Language	4 QH	ENG 1277 Topics in Science Fiction	4 QH
Studies the development of modern English from Anglo-Saxon beginnings; effects of Scandinavian and Norman invasions; dialect geography; evolutionary changes, word formation, and borrowing; and origins of writing and problems of spelling. Readings include both formal and informal writings, literary selections, wills, journals, and private and public letters. (III) <i>Prereq.</i> ENG 1110 and ENG 1111 or equivalent.		Focuses on a single writer or group of writers (such as Wells or writers of contemporary American science fiction), a theme (such as women in science fiction or the future city), or a unifying idea (such as time travel or utopia/dystopia). <i>Prereq.</i> ENG 1110 and ENG 1111 or equivalent.	
ENG 1120 Survey of English Literature 1	4 QH	ENG 1278 Modern Bestseller	4 QH
Surveys the major British writers and major literary forms and works from the Middle Ages to the end of the eighteenth century. Includes works by such writers as Chaucer, Spenser, Shakespeare, Milton, Pope, and Swift. <i>Prereq.</i> ENG 1110 and ENG 1111 or equivalent.		Explores the function of quest, romance, and adventure in a selection of contemporary bestselling fiction. <i>Prereq.</i> ENG 1110 and ENG 1111 or equivalent.	
ENG 1121 Survey of English Literature 2	4 QH	ENG 1279 The Modern Novel	4 QH
Surveys the major British writers and major literary movements from the romantic period through the Victorian and modern periods to the present. Includes works by such writers as Wordsworth, Coleridge, Keats, Browning, Tennyson, Yeats, Lawrence, Lessing, and Beckett. <i>Prereq.</i> ENG 1110 and ENG 1111 or equivalent.		Studies the major British and American novelists of the twentieth century. Considers theme and form in such authors as Lawrence, Woolf, Fitzgerald, Ellison, Doctorow, and Didion. (III) <i>Prereq.</i> ENG 1110 and ENG 1111 or equivalent.	
ENG 1123 Survey of American Literature 1	4 QH	ENG 1280 Modern Drama	4 QH
Surveys the major American writers and major literary forms and works from the colonial period to the Civil War. Includes works by such writers as Bradstreet, Taylor, Cooper, Poe, Hawthorne, Melville, and Emerson. <i>Prereq.</i> ENG 1110 and ENG 1111 or equivalent.		Studies the development of drama from realism to surrealism, from Ibsen to Beckett. <i>Prereq.</i> ENG 1110 and ENG 1111 or equivalent.	
ENG 1124 Survey of American Literature 2	4 QH	ENG 1281 The Modern Short Story	4 QH
Surveys the major American writers and major literary forms and works from the Civil War to the mid-twentieth century. Includes works by such writers as Whitman, Dickinson, Twain, James, Hemingway, Fitzgerald, Faulkner, and Wright. <i>Prereq.</i> ENG 1110 and ENG 1111 or equivalent.		Studies the short story from Poe to the present, including such writers as Joyce and Kafka, Hemingway and Flannery O'Connor. <i>Prereq.</i> ENG 1110 and ENG 1111 or equivalent.	
ENG 1125 Technical Writing	4 QH	ENG 1283 Contemporary Fiction	4 QH
Trains writers in the clear, unambiguous style of technical writing. Requires students to practice these skills by writing technical proposals, process descriptions, feasibility and program reports, and operators' manuals and by making oral presentations. <i>Prereq.</i> ENG 1110 and ENG 1111 and 80 QH.		Examines British and American writers from 1945 to the present, including such figures as Lessing, Burgess, Pynchon, and Barth. Emphasizes experimental and modernist authors. <i>Prereq.</i> ENG 1110 and ENG 1111 or equivalent.	
		ENG 1285 Literature and the Law	4 QH
		Investigates the problems of crime and justice as reflected in literature, from ancient to contemporary works. The secondary focus is the law itself as literature, including explorations of case files and other legal material. The readings encourage students to discover the changing nature of the criminals—heroes or victims or villains—and to deal with the social, psychological, and political facts that define them. <i>Prereq.</i> ENG 1110 and ENG 1111 or equivalent.	

ENG 1286 Literature and Politics**4 QH**

Explores how authors from Sophocles to Mailer represent the religious, moral, and ethical conflicts arising from the acquisition, use, and misuse of political power. Considers literature in several categories: utopian, which establishes a conflict between the ideal and the real; satirical, which threatens a power structure by exposing it to scorn; analytic, which describes the rise to and fall from power of individuals, parties, or states; and investigative, which takes the reader inside a power elite to observe its inner operations. Participants examine the difference between the ideal of government and its reality. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1287 The Literature of Science**4 QH**

Examines historically the discovery methods and models of literature and science, exploring one or more of the following areas: the relationship of the methods and models of literature and science; the treatment of scientific methods and models in literature; the use of literary devices, techniques, and traditions in scientific texts. Readings will be drawn from historically significant scientific texts, literary texts, or some combination of these. (VI) *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1288 Film and Text**4 QH**

Studies either the similarities and differences between literary texts and film versions of those texts or the interrelations between film and literature as means of cultural expression during a specific historical period. For example, students might compare Doctorow's *Book of Daniel* to the film version, *Daniel*, or they might study books and movies of a period like the sixties that reflect the spirit of the era (*Catch-22*, *The Graduate*). *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1289 Shakespeare on Film**4 QH**

Examines the various treatments of Shakespeare's plays on film. Treats the technical aspects of film and how these are used by directors to transfer Shakespeare's plays from the stage to the screen. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1290 Topics in Film**4 QH**

Studies a theme or problem (film and society, film and politics), a period in film history (American film from 1945 to the present), a film genre (the western, film noir), or a film director (Hitchcock, Coppola). *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1293 Topics in Popular Culture**4 QH**

Focuses on such topics as the soap opera, the western, and the police story; on a popular culture activity; or on a popular culture perspective. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1294 Modern Film**4 QH**

Studies a selection of major modern films from around the world from a thematic, cultural, and historical perspective. Special attention is given to political, social, ethical, and psychological issues, as well as to the way common human themes emerge in quite diverse cultures. The course also covers the basic procedures of film interpretation. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1300 Topics in Fiction**4 QH**

Studies a particular kind of fiction, such as the novella; a problem in fiction, such as the role of the narrator; a particular group of fiction writers; or a theme in fiction.

ENG 1307 Approaches to Literature**4 QH**

Examines ancient and modern theories of literature. Includes selections from the criticism of Plato, Aristotle and the Romantics, as well as from Marxist, Freudian, Jungian, and formalist theories.

ENG 1309 Topics in Literary Criticism**4 QH**

Studies a specific problem method or school of criticism, such as structuralism or archetypal criticism.

ENG 1340 Writing Workshop**1 QH**

Emphasizes the writing process: multiple drafts, revision, editing, and publication. Students will write one long paper, often in conjunction with an assigned paper in another course, that will be produced in a class booklet at the end of the quarter. *Prereq.* 80 QH and Pharmacy, Physical Therapy, or Engineering majors.

ENG 1350 Intermediate Writing**4 QH**

Provides writing instruction in an interdisciplinary course in which students develop papers on topics relating to their majors. Led by English faculty, students will also read and respond to essays from various disciplines. Writing will be guided in stages from proposal through finished product. *Prereq.* ENG 1110 and ENG 1111 and 80 QH.

ENG 1351 Creative Writing**4 QH**

Gives the developing writer an opportunity to practice writing various forms of both poetry and prose. Features in-class discussion of student work. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1352 Advanced Writing**4 QH**

Offers an opportunity for experienced writers to hone their skills and develop their interests in different forms and subjects. *Prereq.* ENG 1350 or permission of instructor.

ENG 1357 Poetry Workshop**4 QH**

Advanced workshop in writing and examining original student poetry. Students experiment in established poetic forms and compose their own work. *Prereq.* ENG 1351 or permission of instructor.

ENG 1360 Topics in Writing: Reading and Writing Nonfiction**4 QH**

Combines literary analysis and creative writing. Concentrates on subjects of twentieth-century nonfiction prose such as politics, science, "culture," athletics, and natural history. Considers authors such as Elizabeth Drew, Russell Baker, and Stephen Jay Gould. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1361 The Writing Process**4 QH**

Explores writing in theory and practice. Students observe writers at work and tutor students in the Writing Center as part of the course work. *Prereq.* ENG 1110 and ENG 1111 or equivalent and 80 QH.

ENG 1362 Publication Arts**4 QH**

Acquaints students with basic publishing skills. Each student chooses an area of specialization, such as fiction, medicine, law, or engineering, in order to develop skill in editing manuscripts. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1370 Technical Writing 2**4 QH**

Offers an opportunity for students to develop technical writing skills in a particular subject or form. *Prereq.* ENG 1125 or permission of instructor.

- ENG 1371 Writing for the Computer Industry** 4 QH
Focuses on computer documentation, covering general information and operating and programming instructions. Includes graphics, layout, testing, and revision. *Prereq.* ENG 1125 or permission of instructor and one computer science course.
- ENG 1381 Writing for the Professions: Business Administration** 4 QH
Allows students to gain professional writing experience similar to that of the workplace. Relies on the process approach to writing and features an extended simulation, which integrates common written and oral communication through practical application. *Prereq.* ENG 1110 and ENG 1111 or equivalent.
- ENG 1382 Writing for the Professions: Criminal Justice** 4 QH
Provides students in the College of Criminal Justice with instruction in writing a variety of professional forms. *Prereq.* ENG 1110 and ENG 1111 or equivalent.
- ENG 1400 Topics in Genre** 4 QH
Explores the characteristics of a particular literary form over time through works by various authors. *Prereq.* ENG 1110 and ENG 1111 or equivalent.
- ENG 1401 Introduction to Syntax** 4 QH
Offers an introduction to syntax, the structural rules of a language. Develops and tests syntactic theory which, like other scientific theories, seeks to explain why things are the way they are. The question underlying the investigation is: how do the structures of language relate to the structure of the human mind? (V) *Prereq.* ENG 1110 and ENG 1111 or equivalent.
- ENG 1402 Grammars of English** 4 QH
Provides a study of the rules of sentence construction in English, contrasting the traditional framework with current linguistic models. Students will have the opportunity to prepose, postpose, and extrapose as they learn to manipulate grammatical constructs. *Prereq.* ENG 1110 and ENG 1111 or equivalent.
- ENG 1407 Introduction to Semantics** 4 QH
Focuses on meaning and how it is expressed in language—through words, sentence structure, intonation, stress patterns, and speech acts. How do content, logic, and speakers' and listeners' assumptions affect what sentences can mean? In what ways is linguistic meaning determined by our perceptual system or our culture? *Prereq.* ENG 1110 and ENG 1111 or equivalent.
- ENG 1408 Topics in Linguistics** 4 QH
Examines closely one of a range of topics from the perspective of current linguistics: American dialects, language and law, women's and men's language, words and word structures, or issues in linguistics and literature. *Prereq.* ENG 1110 and ENG 1111 or equivalent.
- ENG 1409 American Novels 1** 4 QH
Focuses on the themes, forms, and techniques of major American novelists of the nineteenth and early twentieth centuries, such as Cooper, Hawthorne, Melville, Twain, and James. *Prereq.* ENG 1110 and ENG 1111 or equivalent.
- ENG 1410 American Novels 2** 4 QH
Studies the modern and contemporary American novel. Considers such writers as Cather, Hemingway, Fitzgerald, Faulkner, Bellow, and Baldwin. (III) *Prereq.* ENG 1110 and ENG 1111 or equivalent.
- ENG 1411 English Drama 1** 4 QH
Surveys representative English drama, excluding Shakespeare, from *Everyman* to Goldsmith and Sheridan. Analyzes dramatic forms as well as the role of the Elizabethan theaters, dramatic conventions, audience content, and acting styles in Restoration farces. *Prereq.* ENG 1110 and ENG 1111 or equivalent.
- ENG 1412 English Drama 2** 4 QH
Surveys representative English drama of the nineteenth and twentieth centuries. Charts the development of the genre from the nineteenth century to the present and discusses themes and forms. *Prereq.* ENG 1110 and ENG 1111 or equivalent.
- ENG 1550 Psychology and Literature** 4 QH
Concentrates on twentieth-century novels and short stories that stress individual behavior and motivation and reveal human mental and emotional processes. Includes such writers as Kafka, Dostoevski, Faulkner, Conrad, and Lawrence. Same as INT 1707.
- ENG 1551 Gender Roles in Literature** 4 QH
Investigates the relation between sex roles and literary portrayals. Selections represent male and female writers and provide a culturally comparative perspective. *Prereq.* ENG 1110 and ENG 1111 or equivalent.
- ENG 1552 Fantasy** 4 QH
Studies the theory and practice of fantasy as found in the works of such writers as Swift, Carroll, C.S. Lewis, Orwell, and Tolkien. *Prereq.* ENG 1110 and ENG 1111 or equivalent.
- ENG 1557 Topics in Fantasy** 4 QH
Explores such areas as dreams, nightmares, and borderline states of consciousness in the works of such writers as Poe and Kafka. *Prereq.* ENG 1110 and ENG 1111 or equivalent.
- ENG 1558, ENG 1559 Literature in Context** 4 QH each
Attempts to place the writer in the context of a special theme. For example, students might discuss a group of authors influenced by their common interest in psychoanalysis, by their social consciousness, or by an interest in the Wild West and the settlement of America. *Prereq.* ENG 1110 and ENG 1111 or equivalent.
- ENG 1600, ENG 1601 Topics in Literature** 4 QH each
Experiments with subjects and themes such as the censored novel, the Holocaust, alienation, and popular song lyrics. *Prereq.* ENG 1110 and ENG 1111 or equivalent.
- ENG 1602, ENG 1607 Major Figure** 4 QH each
Examines in detail the work of one writer such as Mark Twain, Virginia Woolf, or Eugene O'Neill. *Prereq.* ENG 1110 and ENG 1111 or equivalent.
- ENG 1608 The City in Literature** 4 QH
Examines the city in literature as it has been depicted from ancient times to the present, from Plato to Barthelme. Discusses such themes as the city as a locus of evil, the city as a place of possibility, and the city as a center of art and an influence on creative form in an interdisciplinary fashion. *Prereq.* ENG 1110 and ENG 1111 or equivalent.
- ENG 1609 Contemporary American Literature** 4 QH
Studies major movements in American poetry and fiction since 1945. Considers such poets as Plath, Ginsberg, and Ashbery, and

such novelists as Morrison, Pynchon, and Vonnegut. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1610 Early American Literature 4 QH

Examines American literature of the colonial and federal periods, including Bradford, Taylor, Edwards, Franklin, Wheatley, Irving, and Bryant. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1611 New England Renaissance 4 QH

Studies the development of a native tradition in the context of democratic and romantic attitudes toward experience and the paradox these attitudes reveal. Includes such writers as Emerson and Thoreau, Hawthorne, and Melville. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1612 American Realism 4 QH

Examines the realistic tradition in American literature, including local color and native humor, from the end of the Civil War to the turn of the century. Includes such writers as Twain, James, Howells, Crane, and Norris. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1617 Modern American Literature 4 QH

Studies major developments in American poetry and fiction from 1900 to 1945. Considers such poets as Frost, Eliot, Stevens, and Moore, and such novelists as Hemingway, Faulkner, Fitzgerald, and Porter. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1618 Children's Literature 4 QH

Studies the history of children's literature in the English language, with special attention to matters such as genre theory and critical approaches. Includes such works as *Alice in Wonderland*, *Uncle Remus*, *Little Women*, and *The Wizard of Oz*. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1619 Topics in Children's Literature 4 QH

Focuses closely on a specific collection of stories (such as *Grimm's Fairy Tales*), on a specific genre (such as boys' books), on a specific issue (such as the problem of evil), or on children's literature as a form of group socialization. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1621 Nineteenth-Century British Fiction 4 QH

Studies theme and form in the major English novels of the nineteenth century, considering such authors as the Brontës, Charles Dickens, George Eliot, and Thomas Hardy. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1622 Major Twentieth-Century British Novelists 4 QH

Introduces students to British fiction from Joseph Conrad to John Fowles, including such writers as D.H. Lawrence, Virginia Woolf, and others less well known. The aim of the course is to show how novels as artistic creations shape their own worlds while helping us to understand ourselves. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1627 Medieval English Literature 4 QH

Surveys the major works of medieval English literature. Includes works such as *Sir Gawain*, *Piers Plowman*, and *Pearl*. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1628 Chaucer 4 QH

Surveys the work of Chaucer, with particular emphasis on the *Canterbury Tales*. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1629 Topics in Chaucer 4 QH

Examines closely a particular work or group of works (such as *Troilus and Criseyde*) or a theme (such as Chaucer's symbolism). *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1630 Milton 4 QH

Concentrates on Milton's *Paradise Lost*, with supplementary readings in his minor poetry and prose. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1631 Topics in Medieval Literature 4 QH

Focuses on a genre (such as romance or debate literature), a theme (such as alchemy or King Arthur), or other narrow topics. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1632 Sixteenth-Century Literature 4 QH

Concentrates on sonnets, love lyrics, and erotic narrative poetry, principally by Wyatt, Sidney, Marlowe, Spenser, and Shakespeare. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1637 Seventeenth-Century English Literature 4 QH

Examines major writers of the period, such as Bacon and Jonson, Donne and Herbert, Milton and Dryden. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1639 Eighteenth-Century English Literature 4 QH

Surveys the Augustan age of comic masterpieces. Includes such major writers as Pope, Addison, Steele, Swift, Goldsmith, Burns, Johnson, and Boswell. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1640 Topics in Eighteenth-Century Literature 4 QH

Examines closely a single writer or group of writers (such as Fielding or the essayists), a genre (such as satire), a theme (such as reason and madness), or other narrow topics. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1641 Romantic Poetry 4 QH

Surveys the development of English Romantic poetry, both in its lyric and longer forms, in Blake, Wordsworth, Coleridge, Byron, Shelley, and Keats. Emphasizes problems of belief and the relationship of the individual to the surrounding world of natural, social, and historical process. (V) *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1647 Victorian Literature 4 QH

Surveys the major issues and writers of Victorian England, considering such writers as Tennyson and Browning, Dickens and the Brontës, G.M. Hopkins, and Oscar Wilde. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1648 Topics in Victorian Literature 4 QH

Examines closely a single writer or group of writers (such as Arnold or the fantasists) or a theme (such as the movement toward modernism or decadence). *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1649 World Literature 1 4 QH

Surveys world literature from the time of the Greeks through the Renaissance, from Homer to Cervantes. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1650 World Literature 2	4 QH
Surveys world literature from the Renaissance through the modern period, from Voltaire to Brecht. <i>Prereq.</i> ENG 1110 and ENG 1111 or equivalent.	
ENG 1652 Twentieth-Century English Literature	4 QH
Surveys the best and most interesting work of twentieth-century British writers such as William Butler Yeats, D.H. Lawrence, W.H. Auden, Doris Lessing, and Iris Murdoch. <i>Prereq.</i> ENG 1110 and ENG 1111 or equivalent.	
ENG 1658 Introduction to Shakespeare	4 QH
Covers a selection of the major plays of Shakespeare, including both tragedies and comedies. (III) <i>Prereq.</i> ENG 1110 and ENG 1111 or equivalent.	
ENG 1659 Shakespeare's Comedies	4 QH
Studies the romantic comedies, problem comedies, and romances, ranging from <i>The Merchant of Venice</i> to <i>The Tempest</i> . <i>Prereq.</i> ENG 1110 and ENG 1111 or equivalent.	
ENG 1660 Shakespeare's Tragedies	4 QH
Studies the nature of the tragic hero, the questioning of social norms, and the landscape of chaos, ranging from <i>Julius Caesar</i> to <i>Coriolanus</i> . <i>Prereq.</i> ENG 1110 and ENG 1111 or equivalent.	
ENG 1661 Topics in Shakespeare	4 QH
Examines closely such topics as the history plays, Shakespeare in performance, the Shakespearean hero, and psychological approaches to Shakespeare. <i>Prereq.</i> ENG 1110 and ENG 1111 or equivalent.	
ENG 1662 The Bible	4 QH
Studies books of both the Old Testament and the New Testament as literature and as history. <i>Prereq.</i> ENG 1110 and ENG 1111 or equivalent.	
ENG 1667 Modern Poetry	4 QH
Studies the modernist tradition in American and British poetry. Considers such writers as Yeats, Hardy, Frost, Eliot, Stevens, Pound, Williams, and Cummings. (III) <i>Prereq.</i> ENG 1110 and ENG 1111 or equivalent.	
ENG 1677 Contemporary Poetry	4 QH
Studies developments in British and American poetry since 1945. Includes such writers as Plath, Ginsberg, Lowell, Bly, Ashbery, and Heaney. (VI) <i>Prereq.</i> ENG 1110 and ENG 1111 or equivalent.	
ENG 1678 Early African-American Literature	4 QH
Surveys the development and range of black American writers, emphasizing poetry and prose from early colonial times to the Civil War. <i>Prereq.</i> ENG 1110 and ENG 1111 or equivalent.	
ENG 1679 Modern African-American Literature	4 QH
Surveys the development and range of black American writers, emphasizing poetry and prose from the post-Civil War period to the present. <i>Prereq.</i> ENG 1110 and ENG 1111 or equivalent.	
ENG 1690, ENG 1691 Junior/Senior Seminar	4 QH each
(First preference given to students needing the course to complete the major.) Explores an important aspect of literature such as the writer and the audience, the tradition of the new, style and meaning, and the jazz age. Emphasizes independent research in a	

seminar setting. *Prereq.* ENG 1110 and ENG 1111 or equivalent and junior/senior status.

ENG 1710 Freshman English 1 (Honors)	4 QH
Honors equivalent of ENG 1110.	
ENG 1711 Freshman English 2 (Honors)	4 QH
Honors equivalent of ENG 1111.	
ENG 1713 Great Themes in Literature (Honors)	4 QH
Honors equivalent of ENG 1113.	
ENG 1721 Survey of English Literature 2 (Honors)	4 QH
Honors equivalent of ENG 1121.	
ENG 1723 Survey of American Literature 1 (Honors)	4 QH
Honors equivalent of ENG 1123.	
ENG 1725 Technical Writing (Honors)	4 QH
Honors equivalent of ENG 1125.	
ENG 1750 Intermediate Writing (Honors)	4 QH
Honors equivalent of ENG 1350.	
ENG 1758 Introduction to Shakespeare (Honors)	4 QH
Honors equivalent of ENG 1658.	
ENG 1781 Writing for Business (Honors)	4 QH
Honors equivalent of ENG 1381.	
ENG 1810, ENG 1811 Directed Study	4 QH each

Geology

GEO 1119 Marine Resources	4 QH
Provides a qualitative and quantitative survey of renewable and nonrenewable resources from the sea. Aspects covered include offshore oil and gas utilization, marine minerals, tidal power, and coastal zone recreational resources, including polluted beaches and artificial fishing reefs.	
GEO 1120 Physical Oceanography	4 QH
Provides a description of the physical properties and composition of sea water, waves, tides, and ocean currents. Discusses how these properties are measured by oceanographers and how they influence the earth's environment and climate.	
GEO 1121 Biological Oceanography	4 QH
Covers the productivity of animal and plant life in the various zones of the ocean and the growing economic importance of the oceans as a source of food for the expanding world population.	
GEO 1122 New England Fishery Resources	4 QH
Provides an overview of the fisheries industry of New England. Emphasizes environmental factors controlling the distribution, quality, and abundance of fisheries resources. Discusses the methods and the effects of direct human utilization of the resource as well as the indirect effects of pollution and habitat modification.	
GEO 1128 Geology of Oceans and Coasts	4 QH
Examines the relationship between the form of the ocean basins and their margins and the major processes forming them.	

Emphasizes local landforms, including New England beaches, spits, barrier islands, and the continental shelf. (II)

GEO 1140 Environmental Geology 4 QH
Discusses how geologic processes acting at the Earth's surface interact with the human environment. Topics include river and ocean flooding, coastal erosion, landslides, land-use planning, and waste disposal.

GEO 1141 Geological Hazards and Resources 4 QH
Discusses how geologic processes originating deep inside the Earth interact with the human environment. Topics include global crystal movements, volcanic and earthquake hazards, mineral resources, coal and oil, geothermal energy, resource management, and disposal of radioactive wastes. (II)

GEO 1154 Planetary Astronomy 4 QH
Focuses on astronomy of the solar system. Topics include description of the planets and other objects, with discussion of how our understanding has evolved from the days of naked-eye observation to the present era of interplanetary probes. (V)

GEO 1208 Age of Dinosaurs 4 QH
Focuses on major physical and biological events of the Mesozoic Era of earth history. Draws on evidence from the sedimentary rock record to provide a basis for interpretations of Mesozoic life, climates, mountain building, and paleogeography. Demonstrates principles of evolution and extinction through dinosaur paleobiology and history.

GEO 1212 Physical Geology 4 QH
Offers a systematic study of the materials comprising the Earth. Emphasizes the processes that form, transport, alter, and destroy rock, as well as the nature and development of landscape. (II)

GEO 1213 Physical Geology Laboratory 1 QH
Optional lab for GEO 1212. Exercises pertain to mineral and rock identification and topographic and geologic map interpretation. Required for geology majors. *Prereq. GEO 1212; may be taken concurrently.*

GEO 1222 Historical Geology 4 QH
Traces the physical and biological history of the earth through geologic time. Major topics are the origin and evolution of life, mountain building, and continental drift. (II)

GEO 1223 Historical Geology Laboratory 1 QH
Studies fossil representatives of major invertebrate phyla, application of fossils to studies of rock sequences, interpretation of geologic history from geologic maps and sedimentary rocks. *Prereq. GEO 1222; may be taken concurrently.*

GEO 1250 Advanced General Geology 4 QH
Offers an introduction to new and advanced concepts, theories, and hypotheses in geology through discussions, research papers, and individual projects. *Prereq. GEO 1212 and GEO 1222.*

GEO 1308 Petrology 5 QH
Studies the hand specimen and field identification of the common igneous, sedimentary, and metamorphic rocks. Considers the modes of origin and important properties of common rock types. *Prereq. GEO 1212.*

GEO 1310 Descriptive Mineralogy 5 QH
Provides a study of mineralogy, including crystallography and physical, chemical, and descriptive mineralogy of the common rock-forming minerals. *Prereq. Two quarters of chemistry.*

GEO 1311 Optical Crystallography 5 QH
Studies the theory and practical methods of optical crystallography, including the basic techniques for determining the optical constants of crystals using the polarizing microscope and immersion media. *Prereq. GEO 1310.*

GEO 1312 Petrography 5 QH
Covers description and identification of rocks and rock-forming minerals using thin-sections and the petrographic microscope; discussion of textural and mineralogic relationships. *Prereq. GEO 1311.*

GEO 1320 Field Geology 4 QH
Focuses on field techniques as a working guide for the approach, pursuit, and solution of geologic problems. Considers such techniques as geologic map construction, stratigraphic section measurement, and field rock description. Lab consists of field research at a quarry, roadcut, or other geologic exposure. *Prereq. GEO 1212.*

GEO 1412 Geochemistry 4 QH
Offers an evaluation of chemical processes important in the various geologic environments and their effects on the development of the lithosphere. *Prereq. One year of chemistry.*

GEO 1414 Igneous and Metamorphic Petrology 5 QH
Covers the origin and distribution of igneous and metamorphic rocks as interpreted from their chemistry, mineralogy, and field relationships. Lab includes field and petrographic analysis of rock suites. *Prereq. GEO 1312.*

GEO 1418 Structural Geology 5 QH
Covers the description and origin of large- and small-scale rock structures with emphasis on interpretation of the mechanics of deformation. Field and lab analyses of structural problems using maps, models, and rock specimens. *Prereq. GEO 1212 and GEO 1213.*

GEO 1420 Geophysics 4 QH
Studies the basic techniques of reflection and refraction seismology, gravity, aeromagnetic, and heat-flow techniques and the information they provide on the structure, composition, and dynamics of the Earth's interior. Emphasizes the application of these techniques to the search for economic minerals in the earth's crust. *Prereq. PHY 1231.*

GEO 1424 Stratigraphy 5 QH
Offers a study of paleoenvironments and sedimentary-basin analysis based on sedimentary structures, stratigraphic sequences, and fossils. Emphasizes use of geologic sections, drill-cores, and well-logs. Includes lab interpretation of sedimentary rock suites, maps, and sections. *Prereq. GEO 1222.*

GEO 1428 Invertebrate Paleontology 5 QH
Surveys major invertebrate phyla preserved in the fossil record. Discusses micro- and macro-evolutionary principles with consideration of adaptive and functional morphology and the role of paleoenvironments. Lab involves description and classification of fossil invertebrates. *Prereq. GEO 1222.*

GEO 1430 Sedimentation and Sedimentary Environments 5 QH
Describes the physical processes of sedimentation and their role in the interpretation of modern and ancient sedimentary environments. Lab concentrates on the interpretation and description of the physical and textural properties of sediments and sedimentary rocks.

GEO 1432 Sedimentary Petrology 5 QH
Covers origin, classification, and petrography of the major groups of sedimentary rocks. Discusses the environments of deposition of the nonclastic rocks. Lab concentrates on thin-section study of sedimentary rocks. *Prereq.* GEO 1311.

GEO 1435 Coastal Processes 5 QH
Examines the effect of coastal marine processes and the resultant coastal responses. Topics include the dynamics of waves and currents and the associated erosion, transportation, and deposition of sediment, forming beaches, barrier islands, and cliffed structures. *Prereq.* GEO 1212.

GEO 1436 Marine Geology 4 QH
Compares the balance between major sedimentary and tectonic forces in ocean basins and margins to resulting ocean form. Topics include origin of continental shelves, shelf sedimentation and transport, deep-sea processes and sediments. Evaluates resource development of OCS oil, sand and gravel, and manganese nodules. *Prereq.* GEO 1212.

GEO 1438 Geology and Land-Use Planning 4 QH
Studies the causes and solutions of geologic environmental problems related to land use. Topics include the causes and prevention of land-use problems in areas of existing or potential landslides, subsidence, erosion, flooding, and groundwater pollution. *Prereq.* GEO 1140, GEO 1212, or permission of instructor.

GEO 1440 Geomorphology 5 QH
Focuses on the origin and evolution of landscape features by processes operating at or near the Earth's surface. *Prereq.* GEO 1212.

GEO 1442 Water in Environmental Planning 4 QH
Examines aspects of surface runoff from geomorphic and hydrologic perspectives. Develops methods for description and calculation of major river and drainage basin processes and applies the results to the planning process. Examines human modification of these systems, including urbanization, dams, and channelization, and applies this information to an understanding of regulatory processes. (VI) *Prereq.* GEO 1212 or permission of instructor.

GEO 1444 Glacial and Pleistocene Geology 5 QH
Covers the processes of ice movement and the characteristics and distribution of erosional and depositional structures associated with past and present glaciers; introduces Pleistocene chronology and correlations. *Prereq.* GEO 1222.

GEO 1446 Hydrogeology 4 QH
Covers origin, distribution, and flow of groundwater in permeable sediments and bedrock; hydrological and geological characteristics of aquifers; regional flow systems emphasizing rock structure, stratigraphy, and other aspects of the geological environment; principles of hydrogeology mapping and analysis; and introduction to well design and well hydraulics. *Prereq.* GEO 1212, MTH 1107 or 1123, or permission of instructor.

GEO 1447 Groundwater Modeling 4 QH
Uses computers to solve problems in the flow of groundwater. Develops concepts of groundwater flow. Uses the finite-difference method to model steady-state and transient flow. Programs are supplied by the instructor so programming skill is not a prerequisite. *Prereq.* Introductory calculus.

GEO 1448 Groundwater Geochemistry 4 QH
Investigates important geological processes (formation of soil, ore deposits, caves, sinkholes) that occur when groundwater interacts with rock or soil, modifying groundwater chemistry and affecting water quality. Examines groundwater contamination and dispersion, isotope tracer studies, field sampling, and analytical methods. *Prereq.* Two quarters of chemistry.

GEO 1450 Geology Seminar 4 QH
Offers in-depth study, on an individual or small-group basis, of a selected geologic topic. Requires both oral and written presentations. *Prereq.* Major in geology or senior status.

GEO 1712 Physical Geology (Honors) 4 QH
Honors equivalent of GEO 1212. (II)

GEO 1722 Historical Geology (Honors) 4 QH
Honors equivalent of GEO 1222. (II)

GEO 1754 Planetary Astronomy (Honors) 4 QH
Honors equivalent of GEO 1154. (V)

GEO 1816, GEO 1817 Undergraduate Research 4 QH each
Offers independent research on a selected topic under the direct supervision of a faculty member. *Open only to juniors and seniors majoring in geology, with the recommendation of the supervising faculty member and of the department.*

GEO 1820, GEO 1821 Directed Study 4 QH each
Offers independent study of a specific topic not normally contained in the regular course offerings, but within the area of competence of a faculty member. *Open to all students with the recommendation of a faculty member and departmental approval.*

GEO 1824, GEO 1825 Special Studies 1 QH each
Offers independent study of a specific topic. *Open to all students with the recommendation of a faculty member and departmental approval.*

GEO 1830, GEO 1831, GEO 1832, GEO 1833 4 QH each
Junior/Senior Honors Project
For details contact the honors office.

History

HST 1101 Western Civilization to 1648

4 QH

Surveys Western lifestyles, events, institutions, and culture from the earliest human societies through the end of the Thirty Years War. Focuses on Bronze Age civilizations and the origins of universalist religions, Greco-Roman civilization, early Christianity, Islam, the Germanic and Arab successor states to Rome, medieval civilization, the Renaissance and the age of exploration, the Protestant and Catholic reformations, the religious wars that ensued, and the economic transformations that occurred simultaneously. Emphasizes those elements that influenced the development of Western civilization and values. *Not open to students who have completed HST 1121, HST 1701, or HST 4110.* (II)

HST 1102 Western Civilization since 1648

4 QH

Surveys the development of Western—largely European—society and values from the rise of the dynastic and bureaucratic states to current Soviet reforms and the integration of the western European economy. Covers royal absolutism, the rise of the scientific world view, the political and economic revolutions that transformed Europe at the end of the eighteenth century, the development of nationalism and Marxism, the race for colonies, the cultural transformations of the early twentieth century, World War I and the Russian Revolution, the crisis of capitalism and the rise of fascism, World War II and the Holocaust, the Cold War and decolonization, and the current state of Western civilization. *Not open to students who have completed HST 1122, HST 1702, or HST 4111.* (II)

HST 1121 World Civilization to 1648

4 QH

Surveys the development of human institutions from ancient times through the crisis of the mid-seventeenth century. Emphasizes the continuities and changes that occur within civilization and the similarities, differences, and relationships that exist among contemporary civilizations around the world. Covers such topics as the rise of the world's great religions, the military and trading relationships among the various regions of the ancient and medieval worlds, the economic and technological revival of Europe in the early modern period, and the expanding struggle for resources in the crisis atmosphere of the seventeenth century. *Not open to students who have completed HST 1101 or HST 1701, or HST 4110.* (IV)

HST 1122 World Civilization since 1648

4 QH

Examines the world from 1648 to the present. Emphasizes the intellectual, technological, and political expansion of Europe and the reactions of the rest of the world. Covers such topics as the global development of modern dynastic and bureaucratic states; the expansion of the European economy with its attendant trade wars; imperial expansion and the explosion of the slave trade; the development and reaction of American Indian, Asian, and African civilizations to that imperialism; the sporadic extension and eclipse of colonialism; and the growing tensions between traditional patterns of loyalty and authority and national, regional, and even global systems and cultures as we approach the twenty-first century. *Not open to students who have completed HST 1102, HST 1702, or HST 4111.* (IV)

HST 1201 The United States to 1877

4 QH

Focuses on the history of the American people from 1763 to 1877, with an analysis of the American Revolution and the major political, constitutional, diplomatic, economic, and social problems of the new nation. (II)

HST 1202 The United States since 1877

4 QH

Continues the survey of American history, with discussion of the emergence of an industrial economy, an urban society, world responsibility, and expanded federal government. (II)

HST 1241 The Historian's Craft

4 QH

Examines the ways in which the historian studies the past and the nature of historical statements. Problems considered include research techniques, changing conceptions of historical knowledge, and the relation between the historian and the society in which he/she works. (II)

HST 1270 Introduction to Public History

4 QH

Explores the field of public or applied history by surveying its components, including historic preservation, oral history, historical editing, historical archeology, genealogy, family history, business history, local history, material culture, historical resource management, museology, historical research for media, archival management, management of nonprofit organizations, and policy history.

HST 1301 Topics in European History (Group A or B)

4 QH

Covers topics in European history from antiquity to the present.

HST 1321 Medieval Europe (Group A)

4 QH

Studies Europe from the barbarian invasions to the late thirteenth century; the expansion of Christianity and the institutionalization of church and papacy; the emergence of the Holy Roman Empire, England, and France as political units; and social, cultural, and economic developments. (III)

HST 1331 Renaissance Civilization (Group A)

4 QH

Focuses on Europe from 1300 to 1500, when alternatives to medieval institutions became increasingly apparent. Gives special attention to political, economic, and cultural changes in Italy and northern Europe. (III)

HST 1355 Tudor England (Group A)

4 QH

Provides a study of England from the late fifteenth to the early seventeenth century. Topics include an examination of the Tudor contribution to the development of political and social institutions; the Protestant Reformation and the relation between religion and politics; social and economic changes and their relation to the Elizabethan Renaissance. Particular emphasis is placed on intellectual and cultural developments and England's relation to Europe and the New World.

HST 1390 Population in European History (Group A or B)

4 QH

Examines, through population studies, the causes and consequences of changes in human birth, death, marriage, and migration rates from the Old Stone Age to the late twentieth century. Discusses the interaction and impact of climate change, epidemic disease, war, economic development, and political policy, as well as changes in the structure and function of human family and child-rearing systems. (III)

HST 1393 History of Science and Technology (Group A or B)

4 QH

Offers an interdisciplinary survey of the development of science and technology, integrating theories of the philosophy and sociology of science within a historical framework. Emphasizes the environmental and ideological conditions that contribute to the birth and growth of the various sciences and to the relation between these conditions and technological innovation.

HST 1395 History of Flight and Space Travel (Group A, B, or C) 4 QH

Traces the history of nonpowered flight, beginning with the dreams of flight of the ancient Greeks and Leonardo da Vinci; from the balloon experiments of the Montgolfier brothers to contemporary hang gliders; powered flight from the Wright brothers to the SST; and rocketry and space travel from its earliest beginnings to "Enterprise."

HST 1407 Europe, 1870-1921 (Group B) 4 QH

Focuses on Europe from the Franco-Prussian War to the post-World War I settlement: the growing tensions and rivalries and the declining certainties of the end of the nineteenth century, the origins of World War I, the war itself, the Russian Revolution, and the Peace of Paris.

HST 1408 Europe since 1921 (Group B) 4 QH

Focuses on Europe from the Versailles Settlement: the rise of totalitarianism, the Depression, the crises of liberalism and of the European mind, the Appeasement Era, World War II, the Cold War, the end of colonialism, and Europe today.

HST 1424 Victorian England (Group B) 4 QH

Discusses the economic, social, and political life of the English people during Victoria's reign. (IV)

HST 1425 The Decline of Great Britain (Group B) 4 QH

Discusses the economic, social, and political life of the English people in the twentieth century. (IV)

HST 1433 The French Revolution and Napoleon (Group B) 4 QH

Examines the history of France in the age of the *ancien regime* and the Enlightenment as background for the French Revolution and Napoleon.

HST 1441 Hitler's Germany (Group B) 4 QH

Offers a study of the origins and nature of Hitler's Third Reich, emphasizing the personal lives of Nazi leaders in an attempt to understand how seemingly ordinary people could enthusiastically promote wars of aggression and revel in genocidal policies.

HST 1472 The Family in European History (Group B) 4 QH

Examines issues in the history of the European family from the late Middle Ages to the present. Topics include marriage and sexuality, child-rearing practices, the effect of industrialization and revolution on family life, the Victorian family, and the evolution of the modern family. Students will prepare their own family histories.

HST 1473 Women in Modern Europe (Group B) 4 QH

Examines the situation of women in Western Europe from the French Revolution to the 1950s, focusing on France, Britain, and Germany. Topics explored include women in revolutionary movements, the impact of industrialization on women and the family, women in the labor movements, the struggle for suffrage, and the effects of world wars on women.

HST 1481 The Culture of Europe (Group B) 4 QH

Provides an analysis of the culture of the West in the nineteenth and twentieth centuries, focusing on the conjunction of social, cultural, and psychological forces that encouraged or retarded creativity. Considers the interconnections among the arts, social sciences, and sciences within each of the periods covered. (III)

HST 1485 Communism and Revolution (Group B) 4 QH

Focuses on the history of socialism and revolution from the early nineteenth-century utopias to the New Left of the 1960s.

HST 1490 Introduction to Women's Studies: Image, Myth, and Reality (Group B or C) 4 QH

Introduces the issues and methodology involved in the interdisciplinary study of women. Encompasses the historical, political, economic, and social processes that have created both the image and the reality of women in society. Uses guest lecturers to provide an overview of the many disciplinary approaches to the study of women. This course is required for women's studies minors and can be used as a general elective or, depending on the discipline of the coordinator, to satisfy specific concentration requirements. Same as SOC 1150 and INT 1150. (II)

HST 1491 Modern Western Economic History (Group B or C) 4 QH

Surveys the development of the Western world within the framework of economic theory, with attention to social and political ramifications. (III)

HST 1494 History and Film (Group B or C) 4 QH

Explores various historical issues as seen through the eyes of historians and filmmakers. Presents both acted and documentary films in combination with readings from a variety of source and interpretive materials. (II)

HST 1495 Technological Transformations of Society (Group B, C, or D) 4 QH

Examines the relation between technological innovations and the world in which they take place. Discusses conditions necessary for discovery and innovation and the impact of technology on political, economic, and social environments.

HST 1496 War in the Twentieth Century (Group B, C, or D) 4 QH

Provides an analysis of the causes, prosecutions, and effects of the major wars fought in the twentieth century, concentrating on the First and Second World Wars and on the Vietnam War. Using film, simulations, and other materials, classes explore the economic, social, cultural, and psychological impacts of these wars as well as their political, diplomatic, and material aspects.

HST 1497 The World since 1945 (Group B, C, or D) 4 QH

Offers a thematic study of issues and movements that have influenced the world's history since the end of the Second World War. Subjects include the Cold War, the end of colonialism, urbanization, technology and ecology, cultures and counter-cultures, the "global village," and the prospects for human liberation.

HST 1501 Topics in American History (Group C) 4 QH

Covers special topics in the history of the people of the United States from 1789 to the present.

HST 1510 Colonial America (Group C) 4 QH

Covers the discovery and exploration of the New World, the settlement of the English colonies on the North American mainland, their development to 1763, and the origin of their clash with England. (III)

HST 1511 The American Revolution (Group C) 4 QH

Focuses on the coming of the American Revolution, its nature and progress, and its political, economic, and social aftermath.

HST 1514 The Civil War and Reconstruction (Group C) 4 QH

Focuses on the Civil War, its coming, its nature and progress, and the aftermath of Reconstruction.

HST 1516 The United States, 1898-1939 (Group C) 4 QH

Examines social, economic, political, and diplomatic changes from the Progressive Era through the Great Depression and the New Deal.

HST 1517 The United States, 1939-1960 (Group C) 4 QH

Examines social, economic, political, and diplomatic changes from the start of World War II to the election of John F. Kennedy.

HST 1518 The United States since 1960 (Group C) 4 QH

Examines social, economic, political, and diplomatic changes in the United States since 1960.

HST 1525 African-American History to 1900 (Group C) 4 QH

Provides an in-depth examination of the major topics that have shaped the African-American experience. Topics included are slavery and its effects, the role of the antebellum free black, the Civil War and Reconstruction, black response to the new racism of the late nineteenth century, and the W.E.B. DuBois-Booker T. Washington controversy. Same as AFR 1131. (III)

HST 1526 African-American History since 1900 (Group C) 4 QH

Examines the rising tide of African-American nationalism during the twentieth century, with special emphasis on the founding of the NAACP, the Garvey movement, the Harlem Renaissance, the founding of the Black Muslims, A. Philip Randolph's March on Washington movement, the rise of Martin Luther King, Jr., and the demand for change epitomized by the concept of Black Power. Same as AFR 1132.

HST 1531 New England History (Group C) 4 QH

Examines the history of New England from its first settlement by Native Americans to its condition in the late twentieth century. Encompasses a variety of topics, including geography, discovery, exploration, settlement, immigration, politics, industrialization, transportation, and urbanization.

HST 1533 History of Boston (Group C) 4 QH

Explores the history of Boston from colonial times to the present, with attention to the topographical growth and the ethnic composition of the city.

HST 1539 American Jewish History (Group C) 4 QH

Examines Jewish political, social, and cultural history from the arrival of the first group of Jews at New Amsterdam in 1654 to the present. Themes covered include immigration, assimilation, family life, religion, anti-Semitism, Zionism, the Holocaust, and American-Israeli relations.

HST 1543 American Urban History (Group C) 4 QH

Examines the development of urban society in the United States in the nineteenth and twentieth centuries, with emphasis on the effects of immigration and industrialization upon the politics, thought, and society of American cities. (VI)

HST 1544 Environmental History of the United States (Group C) 4 QH

Examines American attitudes and practices toward natural and artificial environments from the first exploration to the present, paying special attention to literature, art, and landscape design. (VI)

HST 1548 American Cultural History to 1860 4 QH

Studies the major issues in the cultural history of the United States from the seventeenth century to 1860. Topics covered include popular religion, the rise of republicanism, leisure and play, foodways, cross-currents of popular and elite literature

and material culture, geographic sectional differences, and the crusade for the Union. Emphasizes the interaction of working-class, middle-class, and elite cultural forms, including music, sermons, literature, prints and paintings, and material culture.

HST 1549 American Cultural History from 1860 4 QH

Studies the major issues in the cultural history of the United States from 1860 to the present. Topics to be analyzed include the growth of a consumer culture, the problems of a perceived cultural decline at the turn of the century, technological perils and hopes, and strategies for physical, mental, and social renewal. Explores the impact and meaning of advertising as well as issues relating to the problems of individualism and community in a mass culture.

HST 1553 The Family in American History (Group C) 4 QH

Explores the history of the family, including the African-American family, in pre-modern and modern American society. Focuses on the traditional and modern roles of parents and children. Investigates patterns of sexuality, marriage, childrearing, work, play, death, and dying. Compares various family types, including elites, middle class, and indigent. Evaluates external forces affecting family structure and life, such as geographical mobility, industrialization, and warfare.

HST 1554 Women in America (Group C) 4 QH

Offers an analysis of women's economic and social roles from the colonial period to the present, with special attention to women's work, their roles in family and community, and nineteenth- and twentieth-century women's rights movements. (III)

HST 1555 American Elites (Group C) 4 QH

Examines the life of elite individuals and groups in American society, especially in the nineteenth and twentieth centuries.

HST 1556 History of the American Home (Group C) 4 QH

Studies the material culture of American vernacular homes from the settlement of the Massachusetts Bay Colony to the advent of the Great Depression. Develops an above-ground "archeology" of the American home to teach students how things—furnishings, buildings, landscape—can reveal unwritten details and meanings about everyday life. Includes the ways in which the broader political, economic, and social issues of the past were reflected and synthesized by Americans' physical surroundings.

HST 1563 History of Sport in America (Group C) 4 QH

Provides a history of the major sports and their impact on American life.

HST 1575 History of Media in America (Group C) 4 QH

Focuses on mass communication in American history, with attention to the role of books, newspapers, magazines, films, radio, and television.

HST 1577 America and the Sea (Group C) 4 QH

Studies the history of exploration and discovery of America, the development of fishing, the rise of ocean commerce, and the history of the American Navy.

HST 1578 The Automobile in America (Group C) 4 QH

Focuses on the impact of the automobile on American society in a historical context. Topics include the abandonment of traditional prohibitions of motorized carriages; the use of planning, taxes, and highway policies to foster the use of the automobile; the effect of the car on land use, recreation, and the economy; and contemporary issues such as pollution and energy.

- HST 1582 The Growth of American Government Since 1935 (Group C)** 4 QH
Examines the expansion of government from Roosevelt to the present, focusing on the reasons for the growth and its consequences, the development of major public policies, and the transformation of the federal role and politics.
- HST 1586 American Military History (Group C)** 4 QH
Surveys the complex relationship between American society and war, from the age of muskets to the neutron bomb.
- HST 1591 American Images of China (Group C or D)** 4 QH
Examines the relations between China and the United States, including the period of the missionaries and opium traders; the era of special privileges; the Open Door policy; the first half of the twentieth century, when China became America's favorite protégé; and the years of strain, warfare, and finally accommodation after the Chinese communists came to power in 1949.
- HST 1592 History of the Vietnam War (Group C or D)** 4 QH
Presents a history of military conflict in Vietnam with attention to the rise of the Viet Minh during World War II, the struggle against the French in the first Indochina war, the impact of the Cold War, and the involvement of the United States after 1950 in Laos and Cambodia as well as Vietnam. Emphasizes the roles of communism and nationalism in Indochina and the motives for American intervention. Films revealing American reaction to the escalating conflict will be shown.
- HST 1604 Modern Latin America (Group D)** 4 QH
Surveys Latin America from the mid-nineteenth century to the present. Topics include dictatorial republics and the continuation of poverty and injustice, the struggles toward democracy, the rise of nationalism, the threat of communism, and the relations between the United States and Latin America.
- HST 1605 The Modern Caribbean (Group D)** 4 QH
Studies the successful Haitian revolt against slavery, peasant movements after the abolition of slavery, the Marcus Garvey movement, Caribbean music and art, the Cuban revolution, Black Power, and American interventions in the Caribbean from the Spanish-American War to Grenada. Same as AFR 1297.
- HST 1610 Topics in Asian History (Group D)** 4 QH
Covers special topics in the history of Asia.
- HST 1612 The Modern Middle East (Group D)** 4 QH
Focuses on the Middle East since 1800, with emphasis on the background of present problems. (VI)
- HST 1613 The Contemporary Middle East (Group D)** 4 QH
Focuses on political, economic, and social developments in the Middle East since World War II.
- HST 1614 The Middle East Today in Fact, Fiction, and Film (Group D)** 4 QH
Presents a study of social, economic, and political changes and conflict in the lives of ordinary people who have been experiencing the recent crises reported in the media. Focuses on common experiences among various peoples—Turks, Armenians, Israelis, Arabs, and Iranians—and emphasizes significant themes: lifestyles, generational conflict, the changing role of women, ethnic or ideological conflict, and the prevalence of identity crises attending cultural and social disruption.
- HST 1620 Early African Civilization (Group D)** 4 QH
Studies the ancient empires of Africa, especially Chana, Songhai, Mali, Zimbabwe, the city-states of East Africa, and the Congo Kingdom. Includes Ethiopian and Egyptian history and controversies to 1800. Same as AFR 1191.
- HST 1621 Modern African Civilization (Group D)** 4 QH
Provides an introduction to modern Africa in the years from 1800 to 1960, showing how a new African civilization arose out of the conflict-ridden conditions imposed on the old. Themes include economic, social, political, religious, and artistic life, as well as the influences of slavery, colonialism, and nationalism. Same as AFR 1197. (IV)
- HST 1623 West African History (Group D)** 4 QH
Surveys the politics and economics of West Africa from the rise of the Mali Empire to the contemporary problems of national development for the countries from Senegal to Nigeria. Same as AFR 1403.
- HST 1625 South African History (Group D)** 4 QH
Presents the historical background to current conflict in the Republic of South Africa and in adjoining Mozambique, Zimbabwe, and Namibia. Examines the rise of the apartheid system—and the opposition and alternatives to it—through the themes of racial conflict, nationalism, and industrialization in this African setting. Same as AFR 1405. (VI)
- HST 1633 Modern China (Group D)** 4 QH
Explores the far-reaching political, economic, and social changes in China from 1800 to the present. Examines the decline of the empire, the impact of the West, the rise of nationalism, industrialization, the changing role of women, the origins of rural revolution, and establishing the Communist state.
- HST 1634 Contemporary China (Group D)** 4 QH
Examines Chinese polity, society, and economy from 1949 to the present, including the restructuring of urban and rural society in the 1950s, the rise of a new class, the emergence of factionalism, the Cultural Revolution, and the impact of the post-Mao economic and political reforms.
- HST 1637 The Making of Modern Japan: From Samurai to Sony (Group D)** 4 QH
Surveys the evolution of Japan from a third-world nation to a superpower. Major themes include the breakdown of feudalism, the impact of the West, the Meiji Restoration, industrialization, militarism, and Japan's post-World War II modern economic miracle.
- HST 1652 Islam Resurgent (Group D)** 4 QH
Analyzes what has been called "the militant revival of Islam" as a rallying point for reformist or revolutionary movements in the Muslim world. Includes little-known Muslim areas outside the Middle East in Africa and Asia. (VI)
- HST 1701 Western Civilization 1 (Honors)** 4 QH
Honors equivalent of HST 1101.
- HST 1702 Western Civilization 2 (Honors)** 4 QH
Honors equivalent of HST 1102.
- HST 1711 America to 1877 (Honors)** 4 QH
Honors equivalent of HST 1201.

HST 1712 America since 1877 (Honors)

Honors equivalent of HST 1202.

HST 1790 Population in European History (Group A or B) (Honors)

Honors equivalent of HST 1390.

HST 1801 Directed Study**HST 1805 Approaches to History**

Requires students to undertake a major historical project based on the application of appropriate methodologies and upon the substantive understanding of a single subject chosen by the course instructor and announced in advance of the quarter. The course is rotated among the department's faculty. Required for all history majors but open to all upperclass students. *Prereq.* 80 quarter hours of work.

HST 1811, HST 1812, HST 1813, HST 1814

Junior/Senior Honors Program

For details contact the honors office.

HST 1821 Fieldwork in History 1

Offers directed work in historical societies, archives, museums, and other historical agencies. Students should consult the department for details. *Prereq.* HST 1101, HST 1102, HST 1201, HST 1202, and 16 QH in other history courses.

Interdisciplinary Courses

INT 1140 War and Conflict in the Nuclear Age

Provides perspectives on the nature and effects of nuclear weapons and their impact on global politics. Explores differing views on policies that might prevent nuclear war.

INT 1150 Introduction to Women's Studies: Image, Myth, and Reality

Surveys the issues and methodology involved in the interdisciplinary study of women. Encompasses the historical, political, economic, and social processes that have created both the image and the reality of women in society. Guest lecturers provide an overview of the many different disciplinary approaches to the study of women. Required for women's studies minors; may be used as either a general elective or, depending upon the discipline of the coordinator, to satisfy specific concentration requirements. Same as SOC 1150. (II)

INT 1201 An Analysis of American Racism

Discusses the cycle by which racism in our institutions helps form our attitudes and the manner in which our attitudes, in turn, shape our institutions. Emphasizes the practical, day-to-day aspects of racism, rather than the theoretical and historical.

INT 1215 Into the Ocean World

Focuses on the seas' complexity and the far-reaching consequences of our interactions with them. A comprehensive interdisciplinary introduction to the oceans. Draws on specialists in the sciences, social sciences, humanities, and arts, each with an interest in marine issues and a commitment to bridging the gaps among disciplines. The course themes are as broad as the oceans, but, when appropriate, we focus on Boston Harbor, a first step into the ocean world for those of us in this area. *Prereq.* Permission of instructor.

INT 1216 A History of Seafaring

Surveys maritime transportation, trade, travel, exploration, and warfare from approximately 3500 B.C. to the end of the wooden boat era in the late nineteenth century. Prior to the widespread application of steam power on land and sea in the nineteenth century, ships were the fastest, safest, and most economical means of transporting large cargoes over long distances. Literary and art history sources are also introduced, along with several films on maritime archaeology. *Prereq.* Permission of instructor.

INT 1217 Water: Planning for the Future

Explores the ways in which water has affected our bodies, our planet, our history, and our culture, and the danger posed by increasing demand, waste, and pollution on our limited supply of usable fresh water. Considers water through scientific, historical, and cultural viewpoints, and surveys contemporary water problems in all their dimensions—political, economic, and technological. Same as SOC 1150. *Prereq.* Permission of instructor. (VI)

INT 1219 Advanced Seminar in Marine Studies

Focuses on outstanding issues in the marine environment. Using a seminar format, students from colleges and universities throughout the Boston area convene to address the complex interactions of disciplines, including scientific, legal, economic, and technical aspects of issues, that come into play in marine affairs. Seminars are lead by experts actively involved in the issues.

INT 1302 Female Perspectives on Society

Examines social science and interdisciplinary feminist literature that focuses on women in families and work, and that deals with physical issues including violence against women and abortion. Incorporates the perspectives of women of color. Considers and evaluates women's views of social life as well as recognizes the difference among women. (VI)

INT 1320 Exploring the Humanities Through Film

Investigates the ways in which the methods of the humanities can expand one's awareness of the sources, statements, and meanings of popular films. Presents series of movies for evaluation in the light of readings, the various approaches presented by faculty members from a number of humanistic disciplines, and students' own experience. (II)

INT 1321 Modernism: Art, Film, and Literature

Examines the interrelation of film, art, and literature in the major movements of the twentieth century to 1939. Studies Futurism, Cubism, Expressionism, Dada, and Surrealism, featuring European films, art, and literature in a comparatist perspective. Examines the persistence of modernist elements in contemporary art, literature, and film. Research paper or creative project due at the end of the term. Team-taught by members of the art, English, and modern languages departments.

INT 1333 Senior Seminar in Human Services

Designed for seniors in human services. Examines emerging roles and career options within the human services field. Study will focus on self-examination of attitudes and values affecting delivery of services, exploration of ethical issues and dilemmas relevant to human services, grantsmanship and funding issues, staff supervision and development within human services agencies, and refinement of group leadership skills.

INT 1336, INT 1337 Field Experience in Human Services 1 and 2 6 QH each

Human services students are required to fulfill two fieldwork placements during the last two years of their program. Each placement consists of 150 hours on-site and generally varies according to the students' interest. Examples of placement sites include community centers, nursing homes, vocational workshops, state and federal agencies for children, and recreational facilities. Experiences are supervised by University staff to maximize the students' learning opportunities. *Prereq.* Junior or senior standing and approval by Human Services Fieldwork coordinator by early in quarter previous to planned quarter of fieldwork.

INT 1570 On Understanding Science 4 QH

Develops the quantitative and qualitative skills needed to critically read about science in newspapers and magazines. Examines the historical, philosophical, and social nature of science; units and scientific notation; technological developments of the last two hundred years; sources of information; and current scientific developments.

INT 1580 Physical Chemistry with Biological Applications 4 QH

Examines physiochemical principles as they apply to biological processes. Topics include chemical equilibria, reaction kinetics, basic thermodynamics, oxidation-reduction reactions and bioenergetics, and transport. Emphasizes problem solving as a tool for learning, using a quantitative approach. Explains basic assumptions and limitations underlying principles; for the most part, however, rigorous derivations are avoided. Makes applications to basic experimental techniques in biochemistry by way of relevant biochemical examples. *Prereq.* BIO 1261.

INT 1700 War and Conflict in the Nuclear Age (Honors) 4 QH

Honors equivalent of INT 1140. Discusses the development of nuclear weapons. Explores the decisions leading to and the aftermath of the nuclear attack on Hiroshima and Nagasaki. Examines the Cold War and the growth of nuclear arsenals, the potential causes of a nuclear war and the probable effects, and this issue's moral questions. Evaluates strategies for preventing nuclear war. (VI)

INT 1702 War Work: The Experience of World War II (Honors) 4 QH

Examines the Second World War as an example of the impact external events can have on professions. This upperclass course is team-taught by faculty from various disciplines.

INT 1704 Northeastern in the 1960s (Honors) 4 QH

Explores how college life and curricula have changed over the past twenty years by studying the microcosm of Northeastern University. Involves research papers on topics such as curriculum changes, student values as reflected in literature and folklore, and the Northeastern riots in comparative context.

INT 1705 Greek Language and Literature (Honors) 4 QH

Focuses on Attic Greek grammar and selections from Greek literature in the original language. Discussion of texts is major part of course.

INT 1706 Industrial Relations (Honors) 4 QH

Presents theories and applications of labor management relations through lectures and case discussions. Focuses on the development of American and European labor movements, emphasizing legal and economic factors. Topics include union objectives, organization, and structure; union government and democracy; collective bargaining; and management approaches to industrial relations.

INT 1707 Psychology and Literature (Honors) 4 QH

Examines literature from a psychoanalytic perspective. Topics include Freud's theories, object relations, Lacan's theories, and Kohut's self-psychology. Discusses works by Charles Dickens, Franz Kafka, Virginia Woolf, Doris Lessing, and Anne Tyler. Same as ENG 1550.

INT 1710 Italy (Honors) 4 QH

Honors interdisciplinary seminar on the history, art and modern culture of Italy with a primary focus on Pisa and Florence.

INT 1721 Modernism: Art, Film, and Literature (Honors) 4 QH

Honors equivalent of INT 1321.

Journalism

JRN 1103 Newswriting 1 4 QH

Covers functions of the editorial department and procedures in obtaining and writing news stories. Offers extensive news writing and an introduction to interviewing. Legal issues defined. Typing skills required. *Prereq.* ENG 1275 with grade of C or better.

JRN 1104 Newswriting 2 4 QH

Offers practice in multi-source and breaking stories. Provides an introduction to government and court reporting, advanced work in interviewing, and experience in writing under deadline pressure. Discusses legal issues. *Prereq.* JRN 1103 with grade of C or better.

JRN 1206 Editing 4 QH

Provides practice in copy editing and headline writing. Presents assignments in photo selection, cropping, and cutline writing. Introduces page layout. *Prereq.* JRN 1104 with grade of C or better.

JRN 1250 Interpreting the Day's News 4 QH

Considers the news of the day and the function of the newspaper, news magazine, and news broadcasts in American life. Topics include rights and responsibilities of the press and how news is gathered, processed, and disseminated by the various media. (VI) For nonmajors as well as majors.

JRN 1301 Basic Photojournalism 4 QH

Covers camera and darkroom procedures along with cropping, assignment techniques, theory, and photo caption methods. *Prereq.* JRN 1104.

JRN 1305 Techniques of Journalism 4 QH

Provides practice in writing in-depth and multiplesource stories requiring significant research. Provides an introduction to investigative reporting, practice in feature writing, and a review of legal issues. *Prereq.* JRN 1104.

JRN 1320 Radio News Gathering and Reporting 4 QH

Covers writing and editing news for radio, with practice in interviewing, organizing news scripts, and integrating audio materials into broadcast. *Prereq.* JRN 1103.

JRN 1336 Public Relations Principles 4 QH

Presents the principles, history, and methods of public relations, processes of influencing public opinion, responsibilities of the public relations practitioner, and analyses of public relations programs. *Prereq.* Sophomore standing.

JRN 1350 Advertising Principles

Covers the development, procedures, economic functions, and responsibilities of advertising: planning, research, production, and other elements that go into successful advertising. *Prereq.* *Upperclass standing.*

4 QH**JRN 1421 Television Newswriting**

Covers writing for TV news as opposed to other news media, importance of the writer-reporter as field-producer and writer-producer, and terms and language used in the production of TV news shows. Includes actual individual production of news shows, field trips to TV stations, and guest lecturers from the TV news media. *Prereq.* *JRN 1103.*

4 QH**JRN 1422 Television News Production**

Demonstrates techniques used by the electronic journalist and TV news producer. Provides the opportunity to build a TV news show and to do reporting with portable TV cameras and editing equipment. *Prereq.* *JRN 1103 and JRN 1421.*

4 QH**JRN 1428 The Role of Journalism in Sports**

Offers an analysis of the impact of journalism on the institution of sports in this country and around the world. Considers sports reporting as a motivator and demotivator from Little League to college and professional levels. Looks at the effect of news media coverage on violence in organized sports, on America's physical fitness, and on other aspects of society.

4 QH**JRN 1430 Fundamentals of Sports Reporting**

Applies principles of news reporting to covering men's and women's sports for print and broadcast media. Emphasizes using sports reference materials, developing contacts, interviewing, and structuring the sports story. Also discusses investigative reporting in sports. *Prereq.* *JRN 1104.*

4 QH**JRN 1432 Local Government Reporting**

Discusses coverage of town/city government, with emphasis on the "beat" approach to reporting public affairs. Focuses on practical, in-the-field experience with town meetings, meetings of boards of selectmen, and other commissions and bodies transacting public business. *Prereq.* *JRN 1104.*

4 QH**JRN 1440 Design and Graphics**

Applies layout and design principles to newspapers, magazines and other print media. Covers type faces, copy measuring, dummymyng, photo sizing, and keeping copy flow charts. Applies design and graphics principles to advertising layout. *Prereq.* *JRN 1206.*

4 QH**JRN 1451 Advertising Copy Writing**

Covers theory and techniques of creating advertising copy for newspapers, magazines, radio, television, and direct mail. Emphasizes fact gathering, copy structure, and advertising design. *Prereq.* *JRN 1103, and JRN 1350.*

4 QH**JRN 1460 Public Relations Problems**

Applies public relations techniques to actual problems; presents case studies in industry, labor, education, government, social welfare, and trade associations. *Prereq.* *JRN 1336.*

4 QH**JRN 1501 History of Journalism**

Traces the development of American journalism from its European and English beginnings. Topics include the colonial press, the great personal journalists of the nineteenth century,

4 QH

and the impact of major technological changes in mass communications media in the twentieth century. Some writing required. *Prereq.* *Upperclass standing.*

JRN 1508 Law of the Press

Examines legal problems of libel, invasion of privacy, and access to government information; discusses the balance between private rights and the public's "need to know." *Prereq.* *Upperclass standing.*

4 QH**JRN 1512 Journalism Ethics and Issues**

Explores the responsibilities of news media and ethical issues confronting decision-makers in journalism. Examines the principles found in codes of the American Society of Newspaper Editors, the Associated Press Managing Editors, the Society of Professional Journalists, and other organizations. Some writing required.

4 QH**JRN 1522 Magazine Writing**

Covers writing and free-lancing magazine articles; analyzing magazines as markets; and selecting the best feature format—how-to-do-it, profile, personal experience, human interest, interpretive pieces, and others. *Prereq.* *JRN 1104.*

4 QH**JRN 1540 Sports Public Relations**

Covers the planning and implementing of public relations functions for professional, amateur, and recreational athletic organizations. Stresses use of journalistic research techniques, implementation of programs, and effective communication with news media and various publics. *Prereq.* *JRN 1103, and JRN 1336.*

4 QH**JRN 1552 Advertising Practice**

Covers the preparation of advertising for print and broadcast media, including campaign planning and space and time buying and scheduling. Includes product research, consumer surveys, and measuring the effects of advertising. *Prereq.* *JRN 1451.*

4 QH**JRN 1561 Public Relations Practice**

Demonstrates practices and techniques employed in the field, including organization of events and functions. Studies campaign planning, research, and media relationships. *Prereq.* *JRN 1103 and JRN 1336.*

4 QH**JRN 1575 Publication Production and Management**

Examines the organizational structure, production methods, and management procedures of print media companies. Analyzes the interaction of business, advertising, production, and circulation departments. *Prereq.* *JRN 1206.*

4 QH**JRN 1617 The Constitution and Mass Communications**

Explores the meaning of freedom of the press through study and discussion of the evolving First-Amendment interpretations of the United States Supreme Court. *Prereq.* *Upperclass standing.*

4 QH**JRN 1703 Newswriting 1 (Honors)**

Honors equivalent of JRN 1103.

4 QH**JRN 1704 Newswriting 2 (Honors)**

Honors equivalent of JRN 1104.

4 QH**JRN 1870, JRN 1880 Seminar**

Offers discussions and readings on topics of current significance in various journalistic fields. *Prereq.* *Upperclass standing.*

4 QH**JRN 1890, JRN 1891 Directed Study in Journalism**

Prereq. *Permission of instructor.*

4 QH each

JRN 1892 Topics

Prereq. Permission of instructor.

JRN 1894, JRN 1895, JRN 1896, JRN 1897**Junior/Senior Honors Project**

For details contact the honors office.

4 QH**4 QH each**

Mathematics

MTH 1000 Mathematics Preliminaries 1**4 QH**

Supplies, together with MTH 1010, the high school math background necessary for a student to enroll in MTH 1101, MTH 1106, or MTH 1113. Includes the arithmetic of signed numbers, fractions, decimals, and percents; operations on polynomials; solving simple first degree equations; and laws of exponents. *Prereq. Permission of course coordinator.*

MTH 1010 Mathematics Preliminaries 2**4 QH**

Supplies, together with MTH 1000, the high school math background necessary for a student to enroll in MTH 1101, MTH 1106, or MTH 1113. Includes solving first and second degree equations and systems of equations; graphic lines and parabolas; solving equations with algebraic fractions; solving word problem applications. *Prereq. Permission of course coordinator.*

MTH 1101 Applications of Algebra**4 QH**

Examines linear equations and their graphs, and systems of linear equations and linear inequalities in two variables, with application to linear programming. Introduces matrices with application to Markov chains; set theory, techniques of counting; permutations and combinations and elementary probability. (I)

MTH 1103 Basic Probability**4 QH**

Covers introduction to probability, sample spaces with equiprobable events, permutations and combinations, conditional probability. Also discusses random variables, introduction to Markov processes. Equiv. to MTH 1150.

MTH 1106 Functions and Algebra**4 QH**

Examines how to solve various kinds of algebraic equations: linear, quadratic, and linear systems in two and three unknowns. Considers applications to word problems such as motion, mixture, and variational problems. Covers the concept of function, graphs, line slopes, and graphs of polynomials. Also discusses some elementary trigonometry and vectors in the plane. Students do not receive credit for this course if they have already received credit for MTH 1188 or MTH 1191.

MTH 1107 Functions and Basic Calculus**4 QH**

Introduces differential calculus. Examines elementary rules of differentiation with application to graph sketching and to maximum and minimum problems. Discusses exponential and logarithmic functions with applications to compound interest, population growth, and radioactive decay. (I) Students do not receive credit for MTH 1107 if they have already received credit for MTH 1114.

MTH 1108 Basic Calculus 2**4 QH**

Offers a review and continuation of differential calculus, graphing and differentiation of trigonometric functions; also presents an introduction to integral calculus with applications to geometric problems and differential equations.

MTH 1113 College Mathematics for Business and Economics**4 QH**

Focuses on sets, rectangular coordinates and graphs, functions and functional notation; linear, exponential, and logarithmic functions. Studies permutations and combination, elementary probability concepts, and simple and compound interest annuities.

MTH 1114 Calculus for Business and Economics**4 QH**

Studies functions, derivatives, differential of polynomials, exponential functions and logarithmic functions; graphics functions using maximum, minimum, inflection points; and optimization in nonlinear problems; marginal analysis of cost, revenue, profit functions. Emphasizes work problems and applications. *Prereq. MTH 1113 or equivalent. Students do not receive credit for MTH 1114 if they have already received credit for MTH 1107.*

MTH 1120, MTH 1121 Intensive Calculus 1 and 2**6 QH each**

Assists students in overcoming deficiencies in precalculus mathematics without losing ground in the MTH 1123 sequence. Reviews high school algebra, introduces trigonometric functions, and covers the material in MTH 1123 and MTH 1124. Includes lecture and homework review sessions. (Students placed in this course by request or on the basis of their College Board scores and the results of an orientation-week diagnostic test.)

MTH 1123 Calculus for Engineering Majors 1**4 QH**

Introduces the differential calculus of one variable, including trigonometric, exponential, and logarithmic functions, together with their graphs. Includes average rates of change, instantaneous rates of change, derivatives, and the chain rule. Covers curve sketching, applications of the derivative to problems involving related rates, and maxima and minima.

MTH 1124 Calculus for Engineering Majors 2**4 QH**

Introduces integral calculus including areas, volumes, and other applications. Studies integration involving trigonometric, inverse trigonometric, exponential, and logarithmic functions. Introduces differential equations. *Prereq. MTH 1123.*

MTH 1125 Calculus for Engineering Majors 3**4 QH**

Studies the calculus of elementary functions in the context of complex numbers. Includes infinite series as well as second order differential equations. *Prereq. MTH 1124.*

MTH 1133 Calculus for Biology Majors 1**4 QH**

Begins with the fundamentals of differential calculus and proceeds to specific problems encountered in biological research. Studies the formulation of physiological problems in terms of differential equations; solutions of differential equations by method of undetermined coefficients; and application to compartmental problems.

MTH 1134 Calculus for Biology Majors 2**4 QH**

Studies integral calculus; trigonometric functions; solutions of differential equations by separation of variables; and advanced compartmental problems. Introduces pharmacokinetics, numerical integration, and Euler's method. *Prereq. MTH 1133.*

MTH 1135 Calculus for Biology Majors 3**4 QH**

Presents functions of several variables, Taylor polynomials, and infinite series. *Prereq. MTH 1134.*

MTH 1137 Discrete Mathematics 1**4 QH**

Covers binary arithmetic, basic set theory, functions and induction; studies permutations, combinations, Euclidean algorithm

and congruence; introduces graph theory and recurrence relations. *Prereq.* MTH 1123.

MTH 1140 Calculus for Science Majors 1 4 QH
Presents introductory calculus primarily for mathematics, physics, and chemistry majors. Together with MTH 1141 and MTH 1142, includes derivatives and integrals of one-variable functions; applications to curve sketching, maxima and minima problems, area, moments, simple volumes, etc.; approximation methods, including numerical integration, root finding, Taylor series, and power series; introduces differential equations. Requires students to master the use of the computer to make value tables and plot curves and to implement simple numerical algorithms.

MTH 1141 Calculus for Science Majors 2 4 QH
Continues MTH 1140. *Prereq.* MTH 1140.

MTH 1142 Calculus for Science Majors 3 4 QH
Continues MTH 1141. *Prereq.* MTH 1141.

MTH 1150 Probability, Statistics, and the Computer 4 QH
Presents a computer-oriented introduction to statistical methods, with applications in the social and life sciences. Examines descriptive statistics, elementary probability, correlation and regression, and the fundamentals of statistical inference (confidence intervals and hypothesis testing) with a minimum of mathematical derivations. Uses a statistical computer package such as MINITAB or SPSS to solve supplementary problems. Equivalent to MTH 1103. *Prereq.* Nonmath majors.

MTH 1152 Statistical Thinking 4 QH
Introduces the statistical style of thinking for students without mathematical sophistication or who ordinarily don't like mathematics. Assigns readings from a wide variety of sources. Uses extensive class discussion and homework problems to teach students to use statistics and to critically evaluate the use of statistics by others. Covers descriptive statistics, statistical tests, confidence intervals, regression, and sampling. (II) *Economics majors do not receive credit for this course if they have already earned credit for ECN 1250 or MSC 1201.*

MTH 1183 Mainstreams of Mathematics 4 QH
Traces the development of some key mathematical ideas, their historical context, and current applications. May include mathematical games and puzzles; number systems past and present; logic and computers; calculus and the rise of modern science, art, and symmetry; and cut-and-paste topology. Assumes no more than high school algebra and geometry. Encourages students with diverse backgrounds to rediscover mathematics through individual projects, supplemental readings, and classroom discussions.

MTH 1188 Problem Solving and Pre-Calculus 1 6 QH
Develops basic algebraic and problem-solving skills in students who indicate these needs and are enrolled in this course rather than the four-credit MTH 1191. Together with MTH 1189, prepares the student for calculus (MTH 1193). Includes writing equations and relating word problems to equations, plotting linear equations, word problems involving algebraic fractions, algebraic operations, radicals, inequalities, functional notation and the graphing of functions. The TI-85 graphics calculator is required for this course. *Students who earn credit for this course may not receive credit for MTH 1106 or MTH 1191.*

MTH 1189 Problem Solving and Pre-Calculus 2 6 QH
Continues MTH 1188. Includes functions and graphing, composite functions and inverse functions, logarithmic and exponential functions and equations, trigonometric functions and their graphs, solving trigonometric problems, trigonometric identities, and vectors in two-dimensions. The TI-85 graphics calculator is required for this course. Equivalent to MTH 1192.

MTH 1191 College Algebra 4 QH
Focuses on fundamental algebraic operations, complex numbers, radicals and exponents, functions, linear and quadratic equations, irrational equations, inequalities, variation, and roots of polynomial equations. The TI-85 graphics calculator is required for this course. *Prereq.* BSET majors only. *Students who earn credit for this course may not receive credit for MTH 1106 or MTH 1188.*

MTH 1192 Pre-Calculus 4 QH
Focuses on logarithms, trigonometric functions of angles in degrees and radians, trigonometric identities and equations, right triangles, oblique triangles, complex numbers in trigonometric form, systems of equations, and determinants. The TI-85 graphics calculator is required for this course. Equivalent to MTH 1189. *Prereq.* MTH 1191 or MTH 4107; BSET majors only.

MTH 1193 Calculus 1 4 QH
Focuses on plane analytic geometry; differentiation of algebraic functions; rate, motion, maximum and minimum problems; derivatives of higher order; curve sketching; basics in functions, limits, and continuity. (Not equivalent to MTH 1123.) *Prereq.* MTH 1192 or MTH 4108; BSET majors only.

MTH 1194 Calculus 2 4 QH
Focuses on applications of derivatives to curve sketching; anti-differentiation; the definite integral, with applications; calculus of nonalgebraic functions — logarithmic, exponential, and trigonometric; calculus of inverse trigonometric functions; techniques of integration; indeterminate forms; and L'Hopital's rule. (Not equivalent to MTH 1124.) *Prereq.* MTH 1193 or MTH 4120; BSET majors only.

MTH 1195 Calculus 3 4 QH
Focuses on polar coordinates, vectors in a plane, calculus of functions of several variables, partial differentiation, multiple integrals, infinite series, vector analysis, and introduction to differential equations. (Not equivalent to MTH 1125.) *Prereq.* MTH 1194 or MTH 4121; BSET majors only.

MTH 1203 History of Mathematics 4 QH
Traces the development of the various branches of mathematics from ancient times to the present, with emphasis on the mathematics itself as well as the mathematicians and cultures that produced it. Teaches students to compute in other number systems, to perform geometric constructions, and to learn proofs of some significant theorems. (III) *Prereq.* Interest in history and mathematics.

MTH 1212 Linear Programming 4 QH
Presents an introduction to concepts and techniques of linear programming, game theory, discrete modeling (shortest path, minimum spanning tree). Explores application to economics, social sciences, and other related fields. (II) *Prereq.* One year of college mathematics.

- MTH 1223 Calculus for Engineering Majors 4** 4 QH
Covers partial derivatives and multiple integrals, with applications. *Prereq.* MTH 1125.
- MTH 1225 Differential Equations (Engineering) 1** 4 QH
Offers a study of ordinary differential equations for engineering students. *Prereq.* MTH 1223 or equiv.
- MTH 1226 Differential Equations (Engineering) 2** 4 QH
Focuses on numerical methods for solving ordinary differential equations, Fourier series, and selected partial differential equations by separation of variables. Intended primarily for engineering students. *Prereq.* MTH 1225.
- MTH 1230 Linear Algebra for Engineers** 4 QH
Introduces matrices through Gaussian elimination. Proceeds to vector spaces and linear equations; orthogonality; eigenvalues and eigenvectors. Emphasizes engineering applications such as systems of ordinary differential equations. *Prereq.* MTH 1225.
- MTH 1237 Discrete Mathematics 2** 4 QH
Covers elements of number theory with an application to public key codes, and elements of group theory with an application to error-detecting and error-correcting codes. *Prereq.* MTH 1137.
- MTH 1238 Combinatorial Mathematics** 4 QH
Introduces techniques of mathematical proofs, including mathematical induction. Explores various techniques for counting such as permutation and combinations, inclusion-exclusion, Polyaenumeration, and the mathematical formulations necessary for these techniques, including elementary group theory and equivalence relations. *Prereq.* Two courses in calculus.
- MTH 1243 Calculus for Science Majors 4** 4 QH
Focuses on methods of calculus and vector analysis to study curves, surfaces, and functions of several variables. Studies parameterization of lines and planes, tangents and normal vectors, partial derivatives, maxima and minima problems, linear approximations, and tangent planes. Some linear algebra. *Prereq.* MTH 1142.
- MTH 1244 Calculus for Science Majors 5** 4 QH
Continues MTH 1243. Covers multiple integration, line integrals, and exact differentials; various forms of Stoke's theorem; and more linear algebra. *Prereq.* MTH 1243.
- MTH 1245 Differential Equations (Science) 1** 4 QH
Focuses on ordinary differential equations and examines first and higher (mostly second) order linear differential equations and systems of equations. Introduces some linear algebra, and also studies eigenvalues and eigenvectors and numerical solution techniques. Applications are treated throughout. *Prereq.* MTH 1143–1145 or equivalent.
- MTH 1246 Differential Equations (Science) 2** 4 QH
Studies the second-order linear ordinary and partial differential equations arising in mechanical vibrations, heat flow and string vibrations. Techniques include Fourier series, eigenfunction expansions, and numerical methods. Stresses analytic solution techniques and their physical applications. *Prereq.* MTH 1245.
- MTH 1301 Linear Algebra 1** 4 QH
Focuses on vectors and vector spaces, including function spaces, subspaces. Examines lengths, angles, scalar products; volumes, determinants; linear independence and dependence, dimension, linear and affine maps, kernel and image. Studies algorithms: row operations, double triangular form, inversion. Introduces linear maps. Gives particular attention to characteristic polynomials, eigenvalues, and eigenvectors in low dimensions. *Prereq.* MTH 1244 or equiv.
- MTH 1302 Linear Algebra 2** 4 QH
Focuses on detailed study of linear maps. Studies symmetric maps and quadratic forms, isometries, skew-symmetric maps; decomposition of general linear maps using symmetric maps and isometries. Covers polynomials evaluated on linear maps, generalized eigenspaces, Jordan form. As time permits, introduces computational methods, with emphasis both on geometry underlying algorithms and on practical advantages and limitations. Surveys related areas in mathematics in which linear ideas play a role. *Prereq.* MTH 1301.
- MTH 1311 Real Analysis 1** 4 QH
Provides the theory and technique for a rigorous treatment of calculus. Topics vary and may include the construction of the real numbers, continuity and convergence, differentiation and integration, and proofs of selected results such as the inverse and implicit function theorems. Emphasizes careful proofs throughout. *Prereq.* MTH 1137 or permission of instructor.
- MTH 1312 Real Analysis 2** 4 QH
Continues MTH 1311. Focuses on calculus, applying the concepts introduced in MTH 1311. *Prereq.* MTH 1311.
- MTH 1321 Introduction to Groups and Their Applications** 4 QH
Presents examples of groups (symmetry groups, permutation groups, matrix groups, cyclic groups) and their subgroups. Studies finite groups and orders of subgroups; homomorphisms and normal subgroups. Also considers applications to some of the following, depending on time and interest: geometry, number theory, crystallography, physics, and combinatorics.
- MTH 1322 Topics in Rings, Fields, and Number Theory** 4 QH
Introduces commutative rings, ideals, integral domains, fields, and Galois theory. Studies extension fields, Gaussian integers, and other topics as time permits. *Prereq.* MTH 1321.
- MTH 1330 Number Theory** 4 QH
Introduces the elementary methods of analytic number theory. Focuses on divisibility, congruences, arithmetical and multiplicative functions, quadratic reciprocity, and equivalent formulations of the prime number theorem. *Prereq.* MTH 1301 or permission of instructor.
- MTH 1337 Foundations of Mathematics 1** 4 QH
Studies the following topics and the shifts in perspective that their development brought about: disputes over the basis for calculus, twentieth-century discoveries in mathematical logic, and the advent of the computer. (V)
- MTH 1338 Foundations of Mathematics 2** 4 QH
Includes set theory, rules for set formation, the axiom of choice and its role in mathematics, transfinite cardinal and ordinal numbers and arithmetic, and axiomatizations of set theory.

MTH 1347 Applied Analysis**4 QH**

Demonstrates the application of mathematics to interesting physical and biological problems. Examines methods chosen from ordinary and partial differential equations, calculus of variations, Laplace transforms, singular perturbations, special functions, dimensional analysis, and other techniques of applied mathematics. *Prereq.* MTH 1246 or permission of instructor.

MTH 1349 Numerical Analysis 1**4 QH**

In practice, computations are never exact. Therefore, the problem of finding efficient methods to calculate sufficiently accurate answers is of fundamental importance. The emphasis of the course is not on recipes for solving problems, proving theorems, or on writing computer programs. Rather, the practical concerns of efficiency and accuracy are illustrated by studying the following problems: roots of a nonlinear equation, simultaneous linear equations, interpolation, and curve-fitting. *Prereq.* Two years of calculus and one course in programming.

MTH 1350 Discrete Algorithms in Analysis**4 QH**

Analyzes problems in differential equations, integration, and ordinary differential equations. (Does not require prior knowledge of differential equations; MTH 1349 is not a prerequisite.) Emphasis is similar to that of MTH 1349. *Prereq.* Two years of calculus and one course in programming.

MTH 1351 Functions of a Complex Variable 1**4 QH**

Focuses on algebra and geometry of complex numbers; concepts of limit, continuity, and derivative in the complex domain; holomorphic functions, series, contour integration; and applications. *Prereq.* MTH 1243 or equiv.

MTH 1352 Functions of a Complex Variable 2**4 QH**

Continues MTH 1351. May include conformal mapping, analytic continuation, Riemann surfaces, the Laplace transform and inverse transform, elliptic functions, and applications. *Prereq.* MTH 1351.

MTH 1367 Geometry**4 QH**

Studies classical Euclidean geometry and symmetry groups of geometric figures by an analytic approach. Teaches how to formulate mathematical propositions precisely and how to construct and understand mathematical proofs. Provides a line between classical and modern geometry with the aim of preparing students for further study in group theory and differential geometry. *Prereq.* Basic linear algebra or permission of instructor.

MTH 1370 Recent Ideas in Geometry**4 QH**

Presents some non-Euclidean geometry, especially hyperbolic and elliptic geometries. Topics include algebraic curves and surfaces. *Prereq.* MTH 1367 or permission of instructor.

MTH 1384 Probability for Engineering**4 QH**

Discusses sample spaces; axioms of probability; random variables and their distributions; expectation, moments, and characteristic function; bivariate distributions; jointly Gaussian random variables; stochastic processes, including autocorrelation function and power spectral density; and estimation of the mean and autocorrelation function in the presence of noise. *Prereq.* MTH 1223 and MTH 1225 or equiv.

MTH 1387 Probability 1**4 QH**

Focuses on probability functions for finite and infinite spaces; conditional probability and independence; discrete and continuous

probability distributions for one or more random variables; expectation; moments; binomial, Poisson, and normal distributions; Law of Large Numbers; and central limit theorem. *Prereq.* MTH 1223 or MTH 1244.

MTH 1388 Probability 2**4 QH**

Studies selected topics, including introduction to stochastic processes, with emphasis on Markov chains or random walk. *Prereq.* MTH 1384 or MTH 1387.

MTH 1390 Mathematical Statistics**4 QH**

Focuses on estimation of parameters, confidence intervals, hypothesis testing, regression, sampling distributions. *Prereq.* MTH 1384 or MTH 1387.

**MTH 1714, MTH 1723, MTH 1724, MTH 1725, MTH 1726,
MTH 1733, MTH 1734, MTH 1735, MTH 1740, MTH 1741,
MTH 1742, Honors Program**
4 QH each

Special sections for honors students of courses MTH 1114, MTH 1123, MTH 1124, MTH 1125, MTH 1223, MTH 1133, MTH 1134, MTH 1135, MTH 1140, MTH 1141, and MTH 1142 respectively.

MTH 1763 Introduction to Computers (Honors)**4 QH**

Honors equivalent of MTH 1163.

**MTH 1801, MTH 1802, MTH 1803, MTH 1804, MTH 1805,
MTH 1806, MTH 1807, MTH 1808 Directed Study**
4 QH

Gives highly motivated students the opportunity to explore mathematical situations and theories in depth. Can be used as an opportunity to examine familiar material in fresh ways or to explore new material not offered in formal courses. Provides students strong in mathematics and the related sciences a chance to develop the art and skill needed to work independently and creatively in mathematics. *Prereq.* Permission of instructor. *Students strong in mathematics are permitted to enroll in graduate mathematics courses.*

MTH 1809 Directed Study: Problem Solving**4 QH**

Emphasizes mathematical problem-solving techniques from a range of areas, including but not limited to integration, differentiation, number theory, group theory, field theory, combinatorics, linear algebra, differential equations, and mathematical modeling. The mathematical model aspect constitutes one third to one half of the course. Analyzes specific realworld models in complete detail, including running and analyzing computer simulations. Requires students to make a number of presentations to the class demonstrating specific techniques. *Prereq.* Permission of instructor.

MTH 1810 Directed Study**1 QH**

Same description as MTH 1801 to MTH 1808. Offered for less intensive projects. *Prereq.* Permission of instructor.

MTH 1811 Directed Study**2 QH**

Same description as MTH 1801 to MTH 1808. Offered for less intensive projects. *Prereq.* Permission of instructor.

**MTH 1825, MTH 1826, MTH 1827, MTH 1828
Junior/Senior Honors Project**
4 QH each

For details contact the honors office.

Modern Languages

Prerequisites listed for modern languages are based on current course numbers at Northeastern. If approved by the Department of Modern Languages and the dean's office, equivalent course work acquired elsewhere may be considered acceptable to satisfy these prerequisites. The following courses are offered in English, and no knowledge of a foreign language is required to take them: LNF 1510, LNF 1511, LNF 1512, LNF 1513, LNI 1510, LNI 1511, LNI 1512, LNR 1500, LNR 1510, LNR 1511, LNS 1500, LNS 1501, and LNS 1510. Locate these courses under the appropriate heading for course descriptions. Language majors interested in obtaining major credit for any of these courses should consult their instructor.

Cinema

The following cinema courses are offered by the Department of Modern Languages. For more information on the cinema studies minor and a listing of all cinema studies courses see page 32. These courses are conducted in English and no knowledge of a foreign language is required to take them. Locate these courses under the appropriate heading for course descriptions. Language majors interested in obtaining major credit for any of these courses should consult their instructor.

- LNF 1521 French Film and Culture**
- LNF 1550 Introductory Film Analysis**
- LNF 1551 Film Theory**
- LNF 1560 Film and Psychoanalysis**
- LNG 1554 Modern German Film and Literature**
- LNS 1550 Spanish Civil War in Spanish Film**

Linguistics

The following linguistics courses are offered by the Department of Modern Languages. For more information on the linguistics major or minor and a listing of all linguistics courses see page 51. These courses are conducted in English and no knowledge of a foreign language is required to take them. Locate these courses under the appropriate heading for course descriptions. Language majors interested in obtaining major credit for any of these courses should consult their instructor.

- LNF 1250 History of the French Language**
- LNL 1235 Applied Linguistics**
- LNL 1260 Introduction to Romance Linguistics**
- LNS 1250 History of the Spanish Language**

Literature and Culture (taught in English)

The following courses are conducted in English and no knowledge of a foreign language is required to take them. Locate these courses under the appropriate heading for course descriptions. Language majors interested in obtaining major credit for any of these courses should consult their instructor.

- LNF 1510 Modern Philosophical French Literature in Translation**
- LNF 1511 The Theme of Solitude in French Literature**
- LNF 1512 Masterpieces of Modern European Fiction**
- LNF 1513 French Seminar: Voltaire and Rousseau**
- LNI 1510 The Works of Dante in Translation 1**
- LNI 1511 The Works of Dante in Translation 2**
- LNI 1512 Italian Seminar: Pirandello**

- LNR 1500 Backgrounds in Russian Culture**
- LNR 1510 The Works of Alexander Pushkin in Translation**
- LNR 1511 Russian Literature in Translation**
- LNS 1500 Backgrounds in Hispanic Culture**
- LNS 1501 Backgrounds of Latin American Culture**
- LNS 1506 Cervantes and His Times**
- LNS 1510 Saints and Sinners: The Vision of Women in the Middle Ages and the Renaissance**
- LNS 1511 Introduction to Caribbean Literature**
- LNS 1512 The Don Juan Figure in Literature**

French

LNF 1101 Elementary French 1 **4 QH**

Designed for students with very little or no prior knowledge of French, this course provides a lively introduction to basic oral expression, listening comprehension, and elementary reading and writing. The audiolingual approach, using practical vocabulary drawn from realistic situations, aims at good pronunciation and ease in response. Each lesson incorporates helpful information about daily life in France and the varied cultures within the world of French speakers. Laboratory practice complements classwork, enables students to work aloud at their own speed, reinforces their acquisition of essential structures, and acquaints them with a vast library of audiovisual resources.

LNF 1102 Elementary French 2 **4 QH**

Continues beginners' exposure to the "four skills"—oral comprehension, speaking, reading, and writing French—so that the linguistic tools needed to understand and function in foreign contexts—at home, abroad, and in the world of literature and film—may be acquired. *Prereq.* LNF 1101.

LNF 1103 Intermediate French 1 **4 QH**

Designed for students who wish to further their audiolingual skills and improve their reading and writing; combines a review and continued study of grammar essentials with oral, writing, and language lab practice. Varied readings include journalistic, cultural, and modern literary texts. Conducted primarily in French so that students may exercise their new skills. *Prereq.* LNF 1102 or *equiv.*

LNF 1104 Intermediate French 2 **4 QH**

Uses the fundamentals of French to promote effective self-expression through speaking and writing and to explore the idiomatic aspects of the language. Through progressive class discussions and oral and written commentaries, students analyze a contemporary French novel or a French cultural reader, screenplay, or collection of short stories. The course strives, first, to help students read and comprehend modern French writing with confidence, and to be able to talk and write about it in good French; and second, to provide preparation for advanced courses. *Prereq.* LNF 1103.

LNF 1107 Reading French in the Arts and Sciences **4 QH**

Designed for students who wish to develop their reading skills, without regard to other aspects of the language such as speaking and writing. Stresses the grammar necessary for reading, together with vocabulary building. Uses scientific and nonscientific texts. May help graduate and undergraduate students who need to pass a reading examination to fulfill specific degree requirements. Not a substitute for LNF 1103 or LNF 1104.

LNF 1111 Elementary French for Business**4 QH**

Similar to LNF 1101, but has added features relevant to business students, such as specialized vocabulary related to the business world and an immediate introduction to French business texts. LNF 1102 may be taken as a sequel to LNF 1111.

LNF 1201 Intensive Review of French**4 QH**

Reviews the principal structures of French in order to equip students with the knowledge that they will need to participate in advanced courses. Stresses vocabulary expansion, grammar review and drills, comprehension, and reading and speaking skills. Required of all French majors, it serves as prerequisite for all other French courses at the 1200 level. Conducted largely in French. Non-majors are invited as well, as this course is an excellent way to review previous French study.

LNF 1202 Advanced French Proficiency 1**4 QH**

Focuses on the students' particular grammar needs as well as the nuances of the language. Designed for qualified students who wish to work on improving their proficiency in speaking and writing French through oral reports, class discussions, compositions, and an advanced review of fundamentals. Varied readings in a range of styles—popular to literary—provide insight into French life and culture. Conducted in French. *Prereq.* LNF 1201 or equiv.

LNF 1203 Advanced French Proficiency 2**4 QH**

Emphasizes further vocabulary building and mastery of fine points of grammar through written composition, prepared oral reports, and reading and discussion of articles from current periodicals. Gives special attention to the latest trends in spoken and written French and the study of idioms. *Prereq.* LNF 1202 or equiv.

LNF 1204 Advanced French Proficiency 3**4 QH**

Continues LNF 1203. Each student is expected to pursue one major project throughout the course, to be completed at the end of the quarter—such as planning and writing an original French magazine with one article to be submitted each week of the term. *Prereq.* LNF 1203 or equiv.

LNF 1225 Introduction to the French-Speaking World**4 QH**

Offers a cultural introduction to the French-speaking world through the study of various reading selections in the textbook *Le Monde Français*. Stresses vocabulary building and proper usage of a wide variety of grammatical forms; also examines the traditional backgrounds and aspects, as well as the contemporary and “pop” aspects, of the cultural heritage of the world's French speakers. Focuses mainly, but not exclusively, on France. *Prereq.* LNF 1104 or equiv.

LNF 1231 Masterpieces of French Literature 1**4 QH**

Provides an introduction to French poetry, theatre (both comedy and tragedy), novels, and autobiographies through the study of key works from the Middle Ages and Renaissance through the Age of Enlightenment. Includes such writers as Villon, Molière, Racine, Voltaire, and Rousseau. Conducted largely in French. Designed to foster a critical approach to reading, improve reading, speaking, and writing skills; and help students apply these new skills to a greater understanding and appreciation of major French contributions to Western and Francophone culture. Encourages group discussions in an effort to bring out the relation between the texts and contemporary issues. (II) *Prereq.* LNF 1201 or equiv.

LNF 1232 Masterpieces of French Literature 2**4 QH**

Continues LNF 1231, which is not a prerequisite. Presents some of the most interesting and significant works of literature from the Romantic Age to the present. Readings may include an “existential” play by Musset, poetry by Baudelaire and Verlaine, and fiction by Flaubert, Camus, and Robbe-Grillet. For a description of methodology, see LNF 1231. (II) *Prereq.* LNF 1201 or equiv.

LNF 1250 History of the French Language**4 QH**

Examines the development and emergence of the French language from its earliest literary manifestations. Offers the opportunity to become familiar with the language's earlier stages. Emphasizes developing a working knowledge of medieval French. Includes the relationship of Old French to Latin, structural characteristics of Old French, and the impact of historical events on language. Compares different stages of French. Conducted in English. *Prereq.* Reading knowledge of French or permission of instructor.

LNF 1305 French Literature in the Seventeenth Century**4 QH**

Presents a study of the nondramatic literature of seventeenth-century France from the baroque through the classical periods. Covers a rich and diverse body of writing encompassing philosophy, poetry, the table, the novel, and epistolary writing. Among the authors treated are Descartes, Pascal, La Rochefoucauld, La Fontaine, Boileau, Mme. de Sevigne, and Mme. de La Fayette. Offered in alternate years. *Prereq.* LNF 1232 or equiv.

LNF 1306 French Theatre in the Seventeenth Century**4 QH**

Studies the dramatic literature of seventeenth-century France, from the baroque through the classical periods. Studies tragedy in the works of Corneille and Racine; comedy, in those of Molière. Offered in alternate years. *Prereq.* LNF 1232 or equiv.

LNF 1307 French Literature in the Eighteenth Century 1**4 QH**

Studies the eighteenth century in France, known as the Age of Enlightenment. It was an age of challenge to established authority in all areas and an age of changing ideas and ideals. This intellectual and political vitality is reflected in the representative works of Marivaux, Montesquieu, Prévost, and Voltaire. Class work includes discussions, oral and written reports. Conducted in French, but English is allowed. Offered in alternate years. *Prereq.* LNF 1232 or equiv.

LNF 1308 French Literature in the Eighteenth Century 2**4 QH**

Focuses on the latter half of the century when we begin to see both the achievements brought about by the spirit of enlightenment and the awakening of the romantic sensibility, in such authors as Diderot, Rousseau, St. Pierre, Laclos, and Beaumarchais. Class work includes discussions, oral and written reports. Conducted in French, but English is allowed. Offered in alternate years. *Prereq.* LNF 1232 or equiv.

LNF 1309 French Literature of the Nineteenth Century 1**4 QH**

Treats romanticism as a major cultural phenomenon. Examines romanticism in poetry and drama, as well as its continuation into the realist novel. Readings include Victor Hugo in poetry and the drama and Honoré de Balzac in the novel, as well as selections from other writers who represent aspects of romanticism and realism. Conducted in French. Offered every other year. *Prereq.* LNF 1232 or equiv.

LNF 1310 French Literature of the Nineteenth Century 2**4 QH**

Explores the reaction against romanticism: aestheticism and personal modes of expression in contrast to the style of the early

romantics. Readings include a novel by Gustave Flaubert and the verse of Charles Baudelaire in *Les Fleurs du Mal*, as well as the poets who followed in his footsteps. Considers Flaubert and Baudelaire as precursors of modern literature. Conducted in French. Offered every other year. *Prereq.* LNF 1232 or equiv.

LNF 1311 French Literature of the Twentieth Century 1 4 QH

Offers a study of the major movements in the narrative and dramatic prose writers up to 1950, including Proust, A. France, Colette, Anouilh, and Camus. Requirements include reading a work from each author, discussing it in class, and presenting oral and written reports. Conducted in French. Offered in alternate years. *Prereq.* LNF 1232 or equiv.

LNF 1312 French Literature of the Twentieth Century 2 4 QH

Continues the study of the 20th century French literature, with an emphasis on the literary journal from Gide to J. Green. Requirements include reading a work from each author, discussing it in class, and presenting oral and written reports in French. Conducted in French. Offered every other year. *Prereq.* LNF 1232 or equiv.

LNF 1315 French Poetry, Past and Present 4 QH

Provides students with a survey of French poetry through the ages, focusing on representative works of the major French poets. Studies poems in their literary and historical context, with an examination of various aspects of French versification. Conducted in French.

LNF 1510 Modern Philosophical French Literature in Translation 4 QH

Studies the works of Camus and Sartre, who are considered the spokesmen for their generation's philosophical concerns. Develops a working knowledge of existentialism. Conducted in English.

LNF 1512 Masterpieces of Modern European Fiction 4 QH

Uses major representative works of fiction from the modern European tradition to introduce students to an array of theoretical and critical perspectives (cognitivism, marxism, formalism, and identity politics). Major authors include Dostoevsky, Mann, Kafka, Camus, Duras, and Achebe. Team taught in English by members of the modern language department. Serves as an introduction to literature for language majors, who can get credit in their field of concentration by reading some of the works in the original language.

LNF 1513 French Seminar: Voltaire and Rousseau 4 QH

Offers an opportunity to study and compare the two great figures of the eighteenth century. Analyzes how, by their contrasting interests, personalities, and views of society, these writers contributed to fundamental changes in the political, philosophical, and literary world of their time—and ours. Includes class discussion, oral and written reports. Conducted in English.

LNF 1521 French Film and Culture 4 QH

Provides an introduction to some of the qualities that have made French film one of the great national cinemas. Focuses on both form and content; relates outstanding directors' major works to the French culture and society of their period. Taught in English; may be taken for French credit if assignments are completed in French. (IV)

LNF 1550 Introductory Film Analysis 4 QH

Provides a basic introduction to film art and compares and contrasts three styles of filmmaking: expressionism, surrealism, and realism as they have been used in Hollywood cinema and the

European art cinema. May be taken for French or German credit with permission of the instructor.

LNF 1551 Film Theory 4 QH

Investigates the fundamental issues surrounding the nature and possibilities of film art. Introduces a variety of theoretical approaches, including semiotics, auteur theory, psychoanalysis, and feminism. Weekly screenings focus on two or three topics: a film author (such as Buñuel, Truffaut, or Welles), a well-defined film movement (such as neorealism, the New German cinema, or the French New Wave), or films about film-making practice. Coursework includes reading articles and writing a research paper using the resources (including film journals) of the Media Center of Snell Library. (V)

LNF 1560 Film and Psychoanalysis 4 QH

Explores the nature and possibilities of the psychoanalytic interpretation of film, demonstrating that such an approach offers an additional dimension to the analysis of a work of art. Focuses on elements in the work that are derivative of unconscious processes, especially fantasies, dreams, symbolism, and imagery. Discusses material in the works studied that relates to neurotic conflicts, character structure and formation, interpersonal relationships, and distortions in psychological development. Weekly film screenings will be accompanied by lectures and discussions; each student will select one film (placed on reserve in the Media Center of Snell Library) for individual study on a topic of his/her choice.

LNF 1801, LNF 1802, LNF 1803, LNF 1804, LNF 1805 Directed Study 4 QH each

Offers students a way of going beyond work given in the regular curriculum; may also enable students to complete major or minor requirements in certain situations. Will not be given in areas adequately covered by existing courses. Priority given to language majors and to juniors and seniors.

LNF 1820, LNF 1821, LNF 1822, LNF 1823 4 QH each

Junior/Senior Honors Project

For details contact the honors office.

German

LNG 1101 Elementary German 1 4 QH

Examines basic grammatical structure of German through practice in listening comprehension, speaking, reading, and writing. Includes classroom and language lab instruction. No previous study of German necessary. (Special sections of this course are run for business students.)

LNG 1102 Elementary German 2 4 QH

Continues LNG 1101. Emphasizes knowledge of the basic grammatical structure of German and flexibility in the four language skills. (Special sections of this course are run for business students.) *Prereq.* LNG 1101 or equiv.

LNG 1103 Intermediate German 1 4 QH

Offers a comprehensive review and reinforcement of the major aspects of German grammar and usage; continues to explore the four major skills of listening comprehension, speaking, reading, and writing; introduces the student to the reading of contemporary literary texts, including a full-length play—*Biedermann und die Brandstifter*, by the Swiss playwright Max Frisch. *Prereq.* LNG 1102 or equiv.

LNG 1104 Intermediate German 2**4 QH**

Offers an opportunity to increase vocabulary as well as flexibility in the four basic language skills. Topics include grammar review, continued exposure to modern literary texts. One full-length play is read—*Der Besuch der alten Dame*, by the contemporary Swiss dramatist Friedrich Dürrenmatt. Successful completion entitles the student to choose from among the upper-level course offerings in the areas of German literature and/or composition and conversation. *Prereq.* LNG 1103 or *equiv.*

LNG 1107 Reading German**4 QH**

Offers an opportunity to develop reading skills, disregarding other aspects of the language, such as speaking or writing. Stresses grammar necessary for reading, together with vocabulary building; scientific and nonscientific texts are read. Provides assistance to students, graduate and undergraduate, who need to pass a reading examination to fulfill specific degree requirements.

LNG 1111 Business German I**4 QH**

Provides an introduction to written German in business administration usage as found in general-purpose professional texts. Develops grammatical knowledge and competence in reading comprehension, translation, and phonetic accuracy. Considers the Federal Republic of Germany as an internationally leading economic power. Discusses weekly readings (in English) from trade publications on aspects of the German business world, including foreign and U.S. trade. Assumes no prior knowledge of German.

LNG 1201 German Composition and Conversation I**4 QH**

Strives to develop facility in speaking and writing German and stresses active use of the language. Provides an opportunity for practice in listening comprehension through German language films or tape-recorded interviews with native German speakers; expansion of vocabulary through guided group discussions on topics of general interest; and development of language skills in areas of individual interest through preparation of oral reports in German. Includes weekly composition assignments and grammar reviews as needed. Language lab. Recommended for students preparing for co-op in Germany. *Prereq.* LNG 1104 or *equiv.*

LNG 1202 German Composition and Conversation 2**4 QH**

Continues German LNG 1201 in content and format with emphasis on independent communication skills. Recommended for students preparing for co-op in Germany. *Prereq.* LNG 1201 or *equiv.*

LNG 1231 Masterpieces of German Literature I**4 QH**

Surveys the major trends in the development of German literature from the Hildebrandslied to Martin Luther. Includes reading of selected works of major authors of the twentieth century such as Hauptmann, Kafka, Mann, Brecht, Dürrenmatt, and Boll. Works read in a particular term will be based partially on theatre performances or film showings planned in the Boston area. Class attendance of these performances is anticipated. Recommended as an introductory step to literature courses LNG 1307 and above. Offered every other year, alternating with LNG 1232. *Prereq.* LNG 1104 or *equiv.*

LNG 1232 Masterpieces of German Literature 2**4 QH**

Studies short fiction from Goethe to the present. Includes Goethe's *Die Leiden des Jungen Werthers*, ETA Hoffman's stories of fantasy and madness, Thomas Mann's *Der Tod in Venedig*, and Franz Kafka's *Die Verwandlung*, as well as stories by Böll, Grass, Christa Wolff, and others. Complements readings and lectures in German with musical and screen adaptations of the works.

Recommended as an introduction to literature courses LNG 1307 and above. May be taken before LNG 1231. *Prereq.* LNG 1104 or *equiv.*

LNG 1309 German Literature of the Nineteenth Century**4 QH**

Offers background and general survey of German literature of the nineteenth century, with particular attention to prose and lyric poetry. Includes poems of all the important romantic poets, beginning with Holderlin, Tieck, Novalis, and extending through Morike. Discusses Novellen by Eichendorff, Tieck, Chamisso, Kleist, Fougue, Keller, Meyer, and Ludwig. Lectures (in German) and reports. *Prereq.* LNG 1232 or *equiv.*

LNG 1311 German Literature of the Twentieth Century**4 QH**

Considers lyric poetry and prose works of important German writers of the twentieth century, including Schnitzler, Hauptmann, Mann, and Kafka. Lectures (in German) and reports. *Prereq.* LNG 1232 or *equiv.*

LNG 1554 Modern German Film and Literature**4 QH**

Introduces contemporary issues in German culture. Studies the importance of the Faust legend as a striving for *Unendlichkeit*—going beyond normal human limitations—as expressed in the classicism of Goethe and the expressionist movement in art and film. Explores the balancing of Weimar as compared to Nazi culture. Examines the multiple pressures and complex issues of the post-war era as outgrowths of these earlier periods. Considers major novels, stories, and poems by Boll, Grass, Mann, and Brecht as adapted by a generation of new German filmmakers—Fassbinder, Schlöndorff, Sanders-Brahms, and Wenders. Conducted in English; may be taken for German credit by special arrangement. (IV)

LNG 1801, LNG 1802, LNG 1803, LNG 1804, LNG 1805**4 QH each****Directed Study**

Offers students a way of going beyond work given in the regular curriculum and may also serve as a means to complete major or minor requirements in certain situations. Directed studies will not be given in areas adequately covered by existing courses. Priority is given to language majors and to juniors and seniors.

LNG 1820, LNG 1821, LNG 1822, LNG 1823**4 QH each****Junior/Senior Honors Project**

For details contact the honors office.

Italian**LNI 1101 Elementary Italian I****4 QH**

Offers the beginner who wants instruction in the essentials of Italian grammar and opportunity to practice speaking and reading the language.

LNI 1102 Elementary Italian 2**4 QH**

Continues study of grammar and basic language skills. Practices advanced conversation and reading. *Prereq.* LNI 1101 or *equiv.*

LNI 1103 Intermediate Italian I**4 QH**

Reviews grammar. Offers progressively more intensive practice in oral and written communication. Selects readings from modern texts. *Prereq.* LNI 1102 or *equiv.*

LNI 1104 Intermediate Italian 2**4 QH**

Reviews grammatical difficulties, with attention given to current idiomatic forms. Greater emphasis on self-expression. Reading of short stories or a modern novel. *Prereq.* LNI 1103 or *equiv.*

LNI 1201 Italian Composition and Conversation 1 4 QH

Aims at helping students strengthen speaking and writing ability through an analysis of the language, oral and written reports, and general discussions on a variety of topics. For students who have mastered the fundamentals of the language. There will be no study of grammar as such. Conducted entirely in Italian. *Prereq.* LNI 1104 or equiv.

LNI 1202 Italian Composition and Conversation 2 4 QH

Continues LNI 1201. Stresses individual work, free discussions, and compositions. Conducted entirely in Italian. *Prereq.* LNI 1201 or equiv.

LNI 1311 Italian Literature of the Twentieth Century 1 4 QH

Explores some of the novels, plays, and poems from a variety of literary trends and styles that evolved between the turn of the century and World War II. Studies authors such as Verga, Pascoli, D'Annunzio, Pirandello, Deledda, and Svevo. Oral and written reports. Conducted in Italian, but students may use English. Offered in alternate years. *Prereq.* LNI 1232 or equiv.

LNI 1312 Italian Literature of the Twentieth Century 2 4 QH

Examines the postwar period to the present. Considers the many important authors since the early forties, and their books reflecting the preoccupations, moods, and aspirations of our changing times. Includes writers such as Moravia, Silone, Vittorini, Pavese, Guareschi, Buzzati, Sciascia, Ungaretti, Montale, and Quasimodo. Requires oral and written reports. Conducted in Italian, but students may use English. Offered in alternate years. *Prereq.* LNI 1232 or equiv.

LNI 1510 The Works of Dante in Translation 1 4 QH

Considers briefly the cultural background and various literary schools that influenced Dante. His life, his character, and minor works are discussed. The *Vita Nuova* and the first cantica of the *Divina Commedia*, the "Inferno," are read and analyzed in some detail. This course is intended for students of any background or major. Bilingual texts are used so that students with a background in Italian and others, may refer to the original for added interest and enrichment. Conducted in English. (III)

LNI 1511 The Works of Dante in Translation 2 4 QH

Continues LNI 1510, but may be taken separately. Studies in detail the other two parts of the *Divina Commedia*, "Purgatorio" and "Paradiso." Open to anyone. Bilingual texts used. Conducted in English.

LNI 1512 Italian Seminar: Pirandello 4 QH

Examines the originality and art of Pirandello by a close study of some of his great plays and short stories. Classwork includes discussions and oral and written reports. Conducted in English.

LNI 1801, LNI 1802, LNI 1803, LNI 1804, LNI 1805 Directed Study 4 QH each

Offers students a way of going beyond work given in the regular curriculum and may also serve as a means to complete major or minor requirements in certain situations. Directed studies will not be given in areas adequately covered by existing courses. Priority is given to language majors and to juniors and seniors.

LNI 1820, LNI 1821, LNI 1822, LNI 1823 4 QH each
Junior/Senior Honors Project

For details contact the honors office.

Linguistics**LNL 1220 Introduction to Phonetics and Phonology 4 QH**

Explores the acoustic and articulatory basis of phonology. Emphasizes hands-on experience with standard areas in modern phonology, including phonetics, phonetic variation, natural classes of sounds, phoneme alternations, rule systems, and prosodic phonology. Introduces major contemporary theories including autosegmental phonology and feature geometry.

LNL 1235 Applied Linguistics 4 QH

Explores the solution of language-based re-world problems. Solutions to these problems depend on information not only from linguistics, but also from a variety of other disciplines such as anthropology, sociology, education, ethnic and area studies (including literature), and public administration. Studies the relationship of linguistics to applied linguistics; second language acquisition; second and foreign language teaching; language policy and planning; and the linguistic aspects of multiculturalism.

LNL 1240 Bilingualism 4 QH

Focuses on the fact that half of the world's population is bilingual, that is, uses two or more languages on a regular basis. Also explores the fact that bilingualism remains a poorly understood phenomenon surrounded by a number of myths: those that hold that bilinguals are found in bilingual countries and are equally fluent in their languages; that bilingual children suffer from cognitive impoverishment; bilingual education hinders the assimilation of minority groups. Reviews all aspects of bilingualism (in the world, in society, in the child, and in the adult). Discusses topics such as biculturalism and language change.

LNL 1260 Introduction to Romance Linguistics 4 QH

Provides a general linguistic introduction to one of the most important language families. Discusses the structural characteristics of several Romance languages. Includes defining a language family, how and why languages change, and the relationship of standard and nonstandard linguistic varieties. Studies contemporary theoretical issues in Romance linguistics including object pronoun placement, word order, creolization, and subject pronouns use. Conducted in English. *Prereq.* Reading knowledge of one Romance language or permission of instructor.

Russian**LNR 1101 Elementary Russian 1 4 QH**

Explores the essentials of grammar, practice in pronunciation, progressive acquisition of a basic vocabulary, idiomatic expressions.

LNR 1102 Elementary Russian 2 4 QH

Continues grammar study; oral and written exercises. *Prereq.* LNR 1101.

LNR 1103 Intermediate Russian 1 4 QH

Offers further knowledge of Russian through oral and written work; the study of grammar, and reading texts of moderate difficulty. *Prereq.* LNR 1102.

LNR 1104 Intermediate Russian 2 4 QH

Continues LNR 1103. *Prereq.* LNR 1103.

LNR 1201 Russian Composition and Conversation 1 4 QH

Offers assistance in developing skills in speaking and writing by means of detailed grammar review and extensive use of audio-visual media. Conducted in Russian. *Prereq.* LNR 1104 or equiv.

LNR 1202 Russian Composition and Conversation 2 4 QH

Continues LNR 1201 with an increased emphasis on speaking the colloquial Russian idiom. Conducted in Russian. *Prereq.* LNR 1201 or equiv.

LNR 1205 Stylistics and Advanced Grammar Analysis 1 4 QH

Designed for students pursuing a major or minor in the Russian language; focuses on modern usage of the Russian language through newspaper and magazine articles and short stories. *Prereq.* LNR 1104 or permission of instructor.

LNR 1309 Russian Short Stories of the Nineteenth Century 4 QH

Offers detailed analysis of selected representative short stories read in Russian; study of the development of this genre. *Prereq.* LNR 1104 or equiv.

LNR 1315 Russian Expository Prose 4 QH

Analyzes lectures, speeches, essays, and critical studies by outstanding Russian scholars. *Prereq.* LNR 1104.

LNR 1316 Russian Folklore 4 QH

Explores various genres of Russian folk literature in Russian. Readings are supplemented with lectures and tape recordings. *Prereq.* LNR 1104.

LNR 1500 Backgrounds in Russian Culture 4 QH

Designed to offer the student a view of Russian culture and civilization; includes guest speakers, films, field trips, and discussions. Conducted in English.

LNR 1510 The Works of Alexander Pushkin in English Translation 4 QH

Offers a survey and analysis in English of Pushkin's artistic prose, lyric poetry, correspondence, friendships, and major literary influences. Conducted in English.

LNR 1511 Russian Literature in English Translation 4 QH

A companion to LNR 1510; provides a survey and analysis in English of some of the works of Tolstoi, Dostoevski, Chekhov, and others. Conducted in English.

**LNR 1801, LNR 1802, LNR 1803, LNR 1804, LNR 1805 4 QH each
Directed Study**

Directed studies offer students a way of going beyond work given in the regular curriculum and may also serve as a means to complete major or minor requirements in certain situations. Directed studies will not be given in areas adequately covered by existing courses. Priority is given to language majors and to juniors and seniors.

**LNR 1820, LNR 1821, LNR 1822, LNR 1823 4 QH each
Junior/Senior Honors Project**

For details contact the honors office.

Spanish

LNS 1101 Elementary Spanish 1 4 QH

Presents essentials of correct usage through acquisition of basic skills in reading, writing, speaking, and aural comprehension.

LNS 1102 Elementary Spanish 2 4 QH

Continues language instruction with increasing attention to vocabulary and skills relevant to persons who wish to become involved with the Hispanic world. *Prereq.* LNS 1101 or equiv.

LNS 1103 Intermediate Spanish 1 4 QH

Includes completion of basic grammatical usage; reading of contemporary Hispanic plays; and oral and written communication based upon assigned readings. *Prereq.* LNS 1102 or equiv.

LNS 1104 Intermediate Spanish 2 4 QH

Offers intensive reading of current topics, conversation practice utilizing skills acquired in previous coursework, and composition practice based upon varied assigned topics. *Prereq.* LNS 1103 or equiv.

LNS 1105 Conversational Spanish 1 4 QH

Emphasizes developing the ability to speak and comprehend Spanish. Particularly able students may be accepted after having completed only LNS 1103. In this case, LNS 1105 may be used to satisfy the language requirement. *Prereq.* LNS 1104 or equiv.; open to nonmajors only.

LNS 1106 Conversational Spanish 2 4 QH

Continues LNS 1105, with further emphasis on the development of oral facility in Spanish. Particularly able students may be accepted after having completed only LNS 1104. *Prereq.* LNS 1105 or equiv.; open to nonmajors only.

LNS 1130 Intensive Spanish 8 QH

Encompasses the same material covered in LNS 1101 and LNS 1102. Students with language-learning ability and a commitment to the study of foreign languages are encouraged to take the course. Students are expected to assimilate the material at an accelerated pace. This is a two-sequence course; students must enroll in both sequences. Satisfactory completion of this course enables the student to take LNS 1103.

LNS 1201 Spanish Composition and Conversation 1 4 QH

Offers practice in writing and speaking Spanish, including written and oral resumes, prepared speeches and themes, and impromptu speaking and writing. Reviews the more subtle problems of grammar.

LNS 1202 Spanish Composition and Conversation 2 4 QH

Offers further practice in oral and written Spanish; continues study of advanced Spanish grammar. *Prereq.* LNS 1201 or equiv.

LNS 1203 Advanced Spanish Proficiency 1 4 QH

Covers advanced elements of Spanish syntax, with emphasis upon achieving superior speaking, reading, and writing skills. Designed for those preparing to enter the teaching profession as well as qualified advanced students. *Prereq.* Permission of instructor.

LNS 1204 Advanced Spanish Proficiency 2 4 QH

Continues the aims and goals of LNS 1203. *Prereq.* LNS 1203 and permission of instructor.

LNS 1231 Masterpieces of Spanish Literature 1 4 QH

Traces the development of Spanish literature from the Middle Ages (las jarchas, *El poema del Cid*, *El libro de buen amor*, *La Celestina*) through the Renaissance and Baroque periods or Golden Age (Garcilaso de la Vega, the picaresque novel, the mystics, Cervantes, Lope de Vega, Calderon). Conducted in Spanish. (II) *Prereq.* LNS 1104 or equiv.

LNS 1232 Masterpieces of Spanish Literature 2**4 QH**

Continues LNS 1231. Surveys the literature of eighteenth-, nineteenth-, and twentieth-century Spain. Includes the literary movements of romanticism, realism, and the generation of '98. Conducted in Spanish. (II) *Prereq.* LNS 1104 or equiv.

LNS 1250 History of the Spanish Language**4 QH**

Examines the development and emergence of the Spanish language. Offers the opportunity to become familiar with the language's earlier stages. Emphasizes developing a working know-ledge of medieval Spanish. Includes the relationship of old Spanish to Latin, structural characteristics of Old Spanish, and the impact of historical events on language. Compares different stages of Spanish. Conducted in English; however, the textbook is in Spanish. *Prereq.* Reading knowledge of Spanish or permission of instructor.

LNS 1301 Spanish Medieval Literature**4QH**

Examines the origins of Spanish Literature from the tenth through the fourteenth centuries. Included among the texts for this class are excerpts from the *jarchas*; the *Poema de Mio Cid*; Berceo's saints' lives; the histories of Alfonso X; *El Conde Lucanor*; *El Libro de Buen Amor*. Also examines non-literary texts such as wills and laws for their historical and literary relevance.

LNS 1306 Spanish Golden Age Theatre**4 QH**

Examines plays by the outstanding dramatists of the seventeenth century: Lope de Vega, Calderon de la Barca, Tirso de Molina, Ruiz de Alarcon, and others. Conducted in Spanish. *Prereq.* LNS 1232 or equiv.

LNS 1309 Spanish Literature of the Nineteenth Century 1**4 QH**

Covers readings in the prose, poetry, and drama of the romantic period, including selections from el Duque de Rivas, Larra, Espronceda, Zorrilla, and Becquer. Conducted in Spanish. *Prereq.* LNS 1232 or equiv.

LNS 1310 Spanish Literature of the Nineteenth Century 2**4 QH**

Offers a study of some of the major novelists of the second half of the nineteenth century, such as J. M. de Pereda, Juan Valera, Emilia Pardo Bazan, and B. Perez Galdos. Conducted in Spanish. *Prereq.* LNS 1232 or equiv.

LNS 1311 Spanish Literature of the Twentieth Century 1**4 QH**

Examines selections from the writings of the Generation of '98: Unamuno, Valle-Inclan, Pio Baroja, Benavente, Azorin, and the Machado brothers. *Prereq.* LNS 1232 or equiv.

LNS 1312 Spanish Literature of the Twentieth Century 2**4 QH**

Focuses on prose and poetry of modern writers, such as Ortega y Gasset, Perez de Ayla, Garcia Lorca, Juan Ramon Jimenez, Gironella, and Jose Cela. *Prereq.* LNS 1232 or equiv.

LNS 1315 Latin American Literature 1**4 QH**

Focuses on Latin American literature from the colonial period to the nineteenth century. Students read a variety of short pieces from an anthology, followed by a full-length work. Authors read include Bernal Díaz, Sor Juana, Jorge Isaacs and José Hernández. *Prereq.* LNS 1204 or equiv.

LNS 1316 Latin American Literature 2**4 QH**

Focuses on Latin American literature from the late nineteenth century to the contemporary period. Students read a variety of short pieces from an anthology, followed by a full-length work. Authors read include Martí, Borges, Castellanos and Vargas Llosa. *Prereq.* LNS 1204 or equiv.

LNS 1400 Spanish Seminar**4 QH**

Focuses upon a narrowly defined theme (that is, a single author, a single work, or a single theme), which students are asked to explore in depth; students are expected to present a final paper based upon individual research. Designed primarily for majors who have progressed to the upper-level literature courses in Spanish. However, nonmajors who show exceptional background may be admitted with the instructor's permission.

LNS 1401 Seminar in Spanish Literature**4 QH**

Focuses on a selected group of Galdos's novels thorough detailed discussion and analysis of the novels and collateral readings. An upper-level literature course designed primarily for majors; nonmajors who show exceptional background in Spanish may be admitted. *Prereq.* Permission of instructor.

LNS 1402 Seminar in the Contemporary Spanish Theatre**4 QH**

Examines a number of dramatists committed to revealing the tragic social and existential aspects of the human condition in contrast to the bourgeois theatre of consumption in Spain. Emphasis is placed on authors such as Vallejo, Sartre, the members of the *generacion realista*, and the "underground" playwrights. Conducted in Spanish. Class participation as well as oral and written projects required. Alternates yearly with LNS 1401. *Prereq.* LNS 1232 or permission of instructor.

LNS 1500 Backgrounds of Spanish Culture**4 QH**

Examines chronologically the forces which have forged Spanish culture and have made Spain the nation it is today. Traces the development of Spain from the prehistoric caves of Altamira to the present. Observes past and present concerns such as divorce and abortion in a Catholic country, education, the role of women, linguistic diversity, separatism and terrorism, and the incorporation of Spain into the European Community. Incorporates history, sociology, anthropology, geography, economics, and politics. Conducted in English. (IV)

LNS 1501 Backgrounds of Latin American Culture**4 QH**

Introduces students to Latin American culture through the study of a broad array of literary and critical writings by Latin American authors and selected films from Latin America. Authors read include Sor Juana, García Márquez, and Jorge Amado. Conducted in English. (IV)

LNS 1506 Cervantes and His Times**4 QH**

Introduces students to *Don Quijote de la Mancha*, Cervantes' major work as well as Spain's greatest masterpiece and its supreme gift to Western culture. Studies Cervantes' minor works, *The Exemplary Novels* and *Interludes*. Examines literary, sociological, philosophical, and historical matters: the development of the novel, genre and narratology, role playing and representation, Spain's triumphs and defeats. Deals with the Spanish Inquisition and censorship and themes such as madness, truth and lying, and appearance and reality. Conducted in English. (III)

LNS 1510 Saints and Sinners: The Vision of Women in the Middle Ages and the Renaissance**4 QH**

Examines the attainment of and the atonement for love and society's changing attitude toward women as reflected in the literature of the times. Covers selected fabliaux, short stories, poems, and plays from Boccaccio, Chaucer, Ruiz, Rojas, Machiavelli, Lope de Vega, Calderon, Quevedo, Racine, Middleton, as well as women writers. Reference is made to historical and sociological materials. Conducted in English. All required readings are in translation.

LNS 1511 Introduction to Caribbean Literature**4 QH**

Provides a comparative introduction to the modern literary traditions of the Spanish-, English-, and French-speaking Caribbean. Includes authors such as Carpentier (Cuba), Naipaul (Trinidad), Zobel (Martinique), and Cardenal (Nicaragua).

LNS 1512 The Don Juan Figure in Literature**4 QH**

Examines the emergence and development of the Don Juan figure in Western literature. Analyzes the character of Don Juan, beginning with his first appearance in the theater of seventeenth-century Spain, and following his development well into the twentieth century. Strives to develop an appreciation and understanding of the character of Don Juan through the centuries, and to analyze the similarities and the differences that may be seen in the character from one cultural milieu to another. Conducted in English; non-English works read in translation. (III)

LNS 1550 Spanish Civil War in Spanish Film**4 QH**

Introduces the Spanish film and provides an understanding of the Spanish Civil War (1936–1939). Uses a semiotic approach; studies images of the Spanish Civil War in photographs and posters to show how fictional and historical texts are transferred to the screen. Examines both documentaries and award-winning feature films by prominent Spanish directors. Demonstrates how the realism of the Spanish cinema is combined with surrealist imagery and metaphor to create a distinctive visual style. (III)

LNS 1801, LNS 1802, LNS 1803, LNS 1804, LNS 1805**4 QH each****Directed Study**

Offers students a way of going beyond work given in the regular curriculum; may also enable students to complete major or minor requirements in certain situations. Will not be given in areas adequately covered by existing courses. Priority given to language majors and to juniors and seniors.

LNS 1820, LNS 1821, LNS 1822, LNS 1823**4 QH each****Junior/Senior Honors Project**

For details contact the honors office.

Music**MUS 1100 Introduction to Music****4 QH**

Offers an introduction to selected works of our Western musical heritage, from earliest to contemporary styles. Consists primarily of a survey and listening format, with emphasis on styles, basic theory, forms, and the historical, social, and artistic periods that these works represent. (II)

MUS 1101 Music: A Listening Experience**4 QH**

Offers a computer-based “how to listen to classical music” course that assumes no previous musical knowledge. Studies masterworks of Western music but develops listening skills that are globally applicable. Students proceed at their own pace under the guidance and supervision of the instructor. All listening is done at a computer in the Media Center in room 200 Snell Library.

MUS 1103 Music as a Social Expression**4 QH**

Examines the processes of music-making and the perceptions of music’s functions in our culture. Considers how music is made, what music means, what kind of music is made, and what music is made to be meaningful. Identifies styles and genres of music

and examines them within an ever-shifting context of aesthetics, social history, and cultural change. (III)

MUS 1104 Survey of African-American Musics**4 QH**

Explores the various musical traditions of African-Americans, with a specific focus on the United States. Examines the impact of African, European, and Native American traditions on African-American music as well as the role of music as an expression of African-American aesthetics, traditions, and life. Considers historical and contemporary forms of African-American musics, with selected video presentations of musical styles. Same as AFR 1153.

MUS 1105 Music of the U.S.A.**4 QH**

Examines American music from the time of Puritan psalm singing to the present. Covers a wide variety of music, including concert music, traditional folk music, jazz, and contemporary styles. (V)

MUS 1106 Women in Music**4 QH**

Examines the multi-faceted role of women in music from the Renaissance through to the present. Discusses the fact that for centuries women have been active and influential patrons, composers, teachers, conductors, and performers in Europe and America. Examines their contributions to classical and popular music and to jazz, with emphasis on such widely varying figures as Elizabeth Jacquet de la Guerre, Fanny Mendelssohn Hensel, Clara Schumann, Amy Beach, Germaine Tailleferre, Billie Holiday, Carla Bley, Ruth Crawford Seeger, Pauline Oliveros, Sarah Caldwell, Antonia Brico, and Nadia Boulanger.

MUS 1107 Principles of Music Literature**4 QH**

Examines the evolution of each major structural element of music through a historical perspective. Also, attempts to link larger categories of music such as classical, popular, and non-Western by examining their common elements. Required of all music majors. *Prereq. Permission of instructor.*

MUS 1109 Introduction to Art, Drama, and Music**4 QH**

Offers an interdisciplinary approach to music and other arts including painting, film, and theater. Examines works of art from various periods in the context of the cultures that produced them. Supplements regular classes with visits to art museums or attendance at concerts and theatrical performances. (II)

MUS 1110 Music in Popular Culture**4 QH**

Deals with the nature of music composed for the mass market. Discusses techniques of recording and merchandising music and selected songs analyzes for their musical content. Traces the evolution of various styles, including ragtime, jazz, blues, rock, and music for the media.

MUS 1111 Rock Music**4 QH**

Examines the development of rock’n’roll and its relationship to blues, rhythm and blues, country, folk, and other styles of music. Considers themes such as the role of rock as youth music, the reflections of social realities in rock songs, the relationship of rock to the recording industry and the mass media, and the changing styles of rock. Emphasizes listening skills.

MUS 1112 Jazz**4 QH**

Examines the evolution of the creative improvisational musical styles commonly called jazz from its African-American roots to its status as one of America’s classical musics and an internationally valued art form. Explores the contributions of African and European musical traditions and African-American spirituals,

work songs, and blues. Examines major contributors and stylistic development and change through selected audio and audio-visual presentations. Also considers the socio-cultural dynamics that have affected musical evolution and acceptance.

MUS 1120 Topics in Music History 4 QH

Provides a chronological view of Western music, while examining the role of music in society and exploring the contributions of influential composers. Discusses representative works from each period, including music by composers such as Machaut, Josquin, Bach, Handel, Mozart, Haydn, Beethoven, Berlioz, Wagner, Mahler, and Stravinsky. (III) *Prereq.* MUS 1201.

MUS 1121 Medieval and Renaissance Music 4 QH

Offers an introduction to European music from the sixth through the sixteenth centuries. Covers a wide variety of music, ranging from the serene elegance of sacred Gregorian chant and the plaintive love songs of the medieval troubadours to the lively dances and humanistic vocal music of the Renaissance. Examines representative works by composers such as Machaut, Landini, Josquin, Palestrina, and Dowland.

MUS 1112 Jazz 4 QH

Examines the evolution of the creative improvisational musical styles commonly called jazz from its African-American roots to its status as one of America's classical musics and an internationally valued art form. Explores the contributions of African and European musical traditions and African-American spirituals, work songs, and blues. Examines major contributors and stylistic development and change through selected audio and audio-visual presentations. Also considers the socio-cultural dynamics that have affected musical evolution and acceptance.

MUS 1120 Topics in Music History 4 QH

Provides a chronological view of Western music, while examining the role of music in society and exploring the contributions of influential composers. Discusses representative works from each period, including music by composers such as Machaut, Josquin, Bach, Handel, Mozart, Haydn, Beethoven, Berlioz, Wagner, Mahler, and Stravinsky. (III) *Prereq.* MUS 1201.

MUS 1121 Medieval and Renaissance Music 4 QH

Offers an introduction to European music from the sixth through the sixteenth centuries. Covers a wide variety of music, ranging from the serene elegance of sacred Gregorian chant and the plaintive love songs of the medieval troubadours to the lively dances and humanistic vocal music of the Renaissance. Examines representative works by composers such as Machaut, Landini, Josquin, Palestrina, and Dowland.

MUS 1122 Music of the Baroque Era 4 QH

Focuses on music of the seventeenth and early eighteenth centuries in Italy, Germany, France, and England. Discusses the emergence of important new genres (such as opera, sonata, and concerto) and examines representative works of major composers (such as Bach, Handel, Corelli, Vivaldi, Rameau, and Purcell).

MUS 1123 Music of the Classical Era 4 QH

Focuses on crucial developments in musical styles and forms of the late eighteenth century and on emerging genres, such as the symphony, the concerto, and the string quartet. Emphasizes the vocal and instrumental works of Haydn and Mozart and the early works of Beethoven.

MUS 1124 Music of the Romantic Era 4 QH

Focuses on romantic realism and idealism as expressed in the music of the nineteenth century. Emphasizes historical, nationalistic, and literary influences. Includes composers such as Beethoven, Schumann, Schubert, Berlioz, Liszt, Verdi, Wagner, Brahms, Tchaikovsky, and Mahler. (V)

MUS 1125 Twentieth-Century Music 4 QH

Focuses on developments in music from 1900 to the present. Examines a broad range of musical styles, including expressionism, neo-classicism, and other major trends in music of the twentieth century. (V)

MUS 1126 New Directions in Music 4 QH

Recognizes that music from 1950 to the present has changed more radically than during any other era in history. Examines new elements in classical and popular music and focuses on the relationship between the two styles.

MUS 1130 The Symphony 4 QH

Studies the symphony as a major genre in the classical, romantic, and contemporary periods. Includes works by composers such as Haydn, Mozart, Beethoven, Schumann, Tchaikovsky, Brahms, Sibelius, and Prokofiev.

MUS 1131 Piano Music: The Great Composers and Performers 4 QH

Gives students the opportunity to hear and analyze some of the greatest works for piano, performed by some of the world's greatest performers. In addition to recordings by internationally acclaimed artists, presents live performances by guest artists from the Boston area.

MUS 1132 Introduction to Opera 4 QH

Offers an analysis of opera as a dramatic genre. Isolates and discusses aria, recitative, ensemble, and other basic elements of opera. Considers number opera, music drama, and Singspiel types of opera. Includes composers such as Mozart, Wagner, Verdi, and Puccini.

MUS 1133 Great Choral Literature 4 QH

Analyzes sacred and secular choral literature from medieval to contemporary times.

MUS 1134 Music and Poetry 4 QH

Examines the art of setting words to music. Confronts the aesthetic problems encountered in a synthesis of two different art forms. Examines that synthesis in selected songs, choral works, tone poems, and operas of diverse periods and styles (classical, folk, and popular). (III)

MUS 1139 Film Music 4 QH

Surveys the use of music in film and video and gives an overview of the mechanics of synchronization and the psychological implications of applying music to film. Analyzes specific dramatic situations, followed by discussion of such scoring techniques as click tracks and picture recording. Studies films such as *The Informer*, *Alexander Nevsky*, *Citizen Kane*, *Forbidden Planet*, *Woman in the Dunes*, and *Tron*. Discusses the works and careers of specific film composers such as David Raskin, Aaron Copland, Jerry Goldsmith, Sergei Prokofiev, and John Williams.

MUS 1140 Mozart 4 QH

Traces Mozart's musical development from child prodigy to mature artist through personal letters and biographies. Analyzes

many of his major compositions, including symphonies, concertos, operas, and chamber works.

MUS 1144 Debussy and the Music of Paris 4 QH
Recognizes that Claude Debussy, impressionist in sound, composed music that marked a turning point toward modern trends. Covers much of his music for piano, orchestra, and voice, including *Suite Pour le Piano*, *Suite Bergamasque*, *Images* (for piano and orchestra), *Nocturnes*, *La Mer*, and *Pelleas et Melisande*. Discusses the music of Satie, Ravel, and Fauré as it relates to that of Debussy.

MUS 1145 Beethoven 4 QH
Analyzes the complex personality and art of Beethoven, his relation to the turbulent times in which he lived, and his role in classical and romantic music. (III)

MUS 1146 George Gershwin 4 QH
Studies the life and works of George Gershwin (1898-1937), including popular song, musical comedy, opera, and orchestral compositions. Explores the relationship of George Gershwin to his times, both musically and historically. Takes as a critical starting point Gershwin's famous statement, "My people are American; my time is today."

MUS 1161 Music Therapy I 4 QH
Examines the application of music as a therapeutic vehicle to release suppressed emotions, to encourage self-expression in psychiatric patients, and to treat a wide variety of disorders. Examines music therapy, in a modern approach to health services, as a supplement to other treatments.

MUS 1162 Music Therapy 2 4 QH
Examines the etiologies, characteristics, and applications of music therapy with the physically handicapped, hearing impaired, visually impaired, learning disabled, emotionally disturbed, speech/language impaired, and geriatric populations in one-to-one and group settings. In addition, studies improvisations and appropriate music materials for the nonmusician and adapted instrument designs tailored to each disability, while exploring the correlation of music and movement. Compares various musical therapy approaches; includes field trips to musical therapy sites in and around Boston. *Prereq.* MUS 1161.

MUS 1163 Sound Health 4 QH
Gives both musicians and non-musicians the opportunity to experience a heightened awareness of the power of music to effect physical and emotional change. Examines the effects of music on the body, mind, and spirit. Begins with an exploration into the awareness of sound and the physiological changes in the body caused by music, and moves through a variety of theories and techniques used to facilitate positive change, relaxation, and reduction of stress. Also considers sound pollution, the effects of vibrations on the body, guided imagery, music and meditation, and new-age environmental music.

MUS 1165 The Music Industry I 4 QH
Examines business-related areas of the music industry. Includes topics such as the make-up and structure of the record industry and music publishing world, the function of performing rights organizations (ASCAP and BMI), and the role of concert and orchestral managers. Includes guests from the various fields who will be invited to lecture in class.

MUS 1166 The Music Industry 2 4 QH
Continues MUS 1165. Covers such topics as artist management, theatrical production, concert promotion, music merchandising, and royalties and contracts. Requires students to undertake case studies of local musical organizations, both on and off campus. *Prereq.* MUS 1165.

MUS 1167 Music Management 4 QH
Introduces music management, including the structure of nonprofit organizations (such as arts service organizations, arts centers, symphony orchestras, chamber orchestras, ensembles, opera companies, and university arts programs) and the structure of profit enterprises. Examines financial management, funding, and audience development. *Prereq.* MUS 1166 or permission of instructor.

MUS 1170 Music and Technology 4 QH
Studies the applications of contemporary technology to music. Discusses basic acoustics, analog and digital recording techniques, computer sound synthesis, and the aesthetics of electronic music. Requires no prerequisites in physics or music theory; however, takes into consideration the particular backgrounds of individual students for projects and papers.

MUS 1171 Computer Literacy for Musicians 4 QH
Provides students with training in the use of a computer for numerous music applications including music transcription and notation, sequencing, orchestration, sound design, and computer-assisted instruction. Students undertake various projects in each of these areas to prepare themselves for the computer-related components of courses throughout their music curriculum.

MUS 1172 Introduction to Music Recording 4 QH
Introduces the history and practice of recording music. Covers recording apparatus; microphones; monophonic, stereophonic, and digital theory and techniques; field recording; studio terminology; basic sound theory; and development of rudimentary editing skills. Also examines the role of the producer versus that of the technician, preparation for recording sessions, and basic legal regulations regarding copyrights and compensation.

MUS 1173 Music Recording 2 4 QH
Offers the opportunity to learn additional skills in the recording process such as material marketing and distribution, contracts and negotiations, and establishing distribution channels. Includes hands-on studio production of record-quality material. *Prereq.* MUS 1172.

MUS 1180 Introduction to World Music 4 QH
Introduces musical traditions from around the world using ethnomusicological approaches to examine the role of music in culture. Focuses on various world musics from the perspectives of the people who create the music and compares these perspectives with our own.

MUS 1181 Musics of Africa 4 QH
Surveys various African musical traditions with respect to their historical, social, and cultural heritage. Examines traditional and contemporary African musics, instruments, and performance traditions. Same as AFR 1156.

MUS 1182 Music of the Middle East 4 QH
Presents an introduction to the music of selected Near Eastern and Arab cultures (such as Persian in the East and Ethiopic and

Berber in Africa). Includes the cantillation styles and practices of various chants of the Hebrew, Christian, and Islamic traditions.

MUS 1183 Music of East Asia 4 QH
Introduces the student to the musical heritage of East Asia by examining music history, the relationship of music cultures to each other, the organization of musical sounds, and music as an aspect of culture. Emphasizes development of basic listening skills. (IV)

MUS 1184 Musics of South America, Latin America, and the Caribbean 4 QH
Examines the highly diverse and unique musical practices of South America, Latin America, and the Caribbean. Focuses on the traditions of native, African, and European heritage in these geographical areas. Provides exposure to musical repertoires, ideas about music, the relationship of music to culture, musical instruments, musical contexts, and musical syncretism.

MUS 1200 Fundamentals of Music 4 QH
Provides basic instruction for those who want to learn how to read music or how to write a tune. Gives students the opportunity to learn to sight-read music and to compose in some of the basic forms. Students may elect to take MUS 1210 for one extra credit.

MUS 1201 Music Theory 1 4 QH
Continues MUS 1200. Offers the opportunity to improve melodic and rhythmic dictation skills; introduces melodic and harmonic practices to tonal music with additional work in chord and melody construction, leading to the composition of simple four-voice chorales. Students may elect to take MUS 1210 for one extra credit.

MUS 1202 Music Theory 2 4 QH
Continues MUS 1201. Focuses on harmonic practices in tonal music. Examines the role and function of harmony through analysis of musical examples and composition of four-voice chorales. Students may elect to take MUS 1210 for one extra credit. *Prereq.* MUS 1201.

MUS 1203 Music Theory 3 4 QH
Continues MUS 1202 and focuses on aspects of chromatic harmony. Discusses the construction and function of borrowed chords, altered chords, and non-diatonic harmony. Students may elect to take MUS 1210 for one extra credit. *Prereq.* MUS 1202.

MUS 1204 Music Theory 4 4 QH
Introduces the student to methods of musical analysis. Examines phrasing, periodicity, tension-repose, and other structural factors of musical compositions. Students may elect to take MUS 1210 for one extra credit. *Prereq.* MUS 1203.

MUS 1209 Functional Piano 4 QH
Gives students the opportunity to develop the keyboard skills appropriate for an undergraduate concentration in music. Studies realization of a figured bass, the harmonization of a melodic line, simple score reading (including treble, bass, alto, and tenor clefs), transposition, sight-reading, and the ability to play any of the major or minor scales. *Prereq.* MUS 1202.

MUS 1210 Music Theory Lab 1 QH
Provides both group and individual instruction in ear training, sight-singing, and keyboard skills. This lab can be taken only in conjunction with the department's music theory courses (MUS 1201, MUS 1203, MUS 1204). May be repeated for credit.

MUS 1211 Sight-singing 4 QH
Offers students the opportunity to learn how to read music at sight without the aid of a musical instrument, an essential skill for every musician. Emphasizes mastery of the skills of rhythm reading, as well as solfège and triad recognition in all diatonic keys, through class instruction and daily practice. Requires knowledge of the fundamentals of musical notation. *Prereq.* MUS 1201 or equivalent.

MUS 1230 Chorus 1 QH
Allows students to participate as performers in one or more ensembles under the direction of a faculty conductor. May be repeated for credit. *Prereq.* Permission of instructor.

MUS 1231 Band 1 QH
Allows students to participate as performers in one or more ensembles under the direction of a faculty conductor. May be repeated for credit. *Prereq.* Permission of instructor.

MUS 1232 Chamber Ensembles and Orchestra 1 QH
Allows students to participate as performers in one or more ensembles under the direction of a faculty conductor. May be repeated for credit. *Prereq.* Permission of instructor.

MUS 1233 Early Music Players 1 QH
Allows students to participate as performers in one or more ensembles under the direction of a faculty coach. May be repeated for credit. *Prereq.* Permission of instructor.

MUS 1241 Piano Class 1 4 QH
Provides introductory-level study of piano designed for students with or without previous experience. Combines skills in reading music with improvisation and functional piano. Introduces some basic theory to help clarify the structure of class repertoire. Allows students to progress at their own pace. Determines grades by the amount of repertoire mastered during the quarter.

MUS 1242 Piano Class 2 4 QH
Continues the skills developed in MUS 1241, with emphasis on increasing students' flexibility at the keyboard through the study of scales, transposition, and modulation. *Prereq.* MUS 1241.

MUS 1244 Voice Class 1 4 QH
Gives students the opportunity to learn the basic vocal production required for fine singing. Chooses repertoire, both classical and contemporary, for each student to learn and perform in lessons and before the entire class. Covers the following subjects: diction, the physiology of singing, resonance, registers, and interpretation. Also studies the basics of music reading and sight-singing. Discusses some interpretation and plays recordings of the greatest vocal artists for class analysis. *Prereq.* Permission of instructor.

MUS 1247 Guitar Class 1 4 QH
Provides an introduction to the fundamentals of classical guitar playing for those with or without prior knowledge of the guitar. Covers music reading and theory. Requires students to perform alone and in ensemble with other members of the class. Augments the syllabus by live performances from outside professional and student classical guitarists. Bases final grades on several written examinations and student performance.

MUS 1250 Conducting 4 QH
Provides instruction in the basic gestures used in conducting vocal and instrumental ensembles. Topics include beat patterns, conveying phrasing and articulation, cueing, controlling tempo

and dynamics, score study, and rehearsal techniques. Provides an opportunity for students enrolled in the course to constitute a laboratory ensemble for regular practicum. *Prereq.* *Ability to read music and to sing or play an instrument.*

MUS 1261 Music Lessons 1 QH

Offers private instruction in voice or in an instrument. Arranges lessons on a half-hour or 45-minute basis. Contact the music department for arrangements. Lab fee.

MUS 1265 Jazz Improvisation 1 4 QH

Focuses on repertory as well as performance. Examines the great improvisational artists in American music, such as Charlie Parker, Miles Davis, and John Coltrane. Approaches analysis from a theoretical as well as a practical perspective. Explores the use of rhythm, chords, scales, and modes in the creative improvisation process.

MUS 1301 Form and Analysis 1 4 QH

Examines representative examples of structural principles governing the melodic, harmonic, rhythmic, and formal components of music. Focuses on music from the sixteenth to the mid-nineteenth centuries. *Prereq.* *MUS 1204.*

MUS 1302 Form and Analysis 2 4 QH

Continues MUS 1301. Examines works from the late nineteenth century to the present. Includes selected readings by prominent twentieth-century theorists. *Prereq.* *MUS 1301.*

MUS 1365 Seminar in the Music Industry 4 QH

Offers advanced students the opportunity to explore contemporary events and issues in the music industry. Expects students to apply and distill knowledge accumulated in prior courses. Gives students the opportunity to develop case studies and engage in actual music industry activities such as producing concerts, managing road tours, promoting records, or planning promotional campaigns for musical merchandise marketing. Offers forums for debate on current controversies and developments in the music industry. *Prereq.* *MUS 1166 and junior standing.*

MUS 1366 Copyright Law for Musicians 4 QH

Explores the unique character of music-related copyright issues. Investigates common law copyright; statutory copyright; ownership, duration, and transfer of copyright; fair use; works for hire; infringements and remedies; public domain works; and international copyright. *Prereq.* *MUS 1166 or permission of instructor.*

MUS 1367 Computer Applications in Music Business 4 QH

Uses state-of-the-art computer applications in an advanced exploration of the business of music. Investigates computer applications in the record industry, artist management, arts administration, music merchandising, and music publishing. *Prereq.* *MUS 1166.*

MUS 1421 Historical Traditions 1: American Music 4 QH

Provides an overview of music in the United States in cultural and stylistic contexts. As the first of a sequence of courses for music majors, introduces historical methods of music. Studies a broad range of styles, including folk, popular, and classical musics. *Prereq.* *MUS 1107.*

MUS 1422 Historical Traditions 2 4 QH

Provides an overview of early Western music, from the middle ages through the seventeenth century in cultural and stylistic contexts. Concentrates on classical music, but will also deal with

music as a living language, related to other kinds of music and other arts and made by people for different reasons. Uses scores to help understand the different ways music can be written and the different aesthetic definitions of beauty, pleasure, and meaning in sound. *Prereq.* *MUS 1421.*

MUS 1423 Historical Traditions 3 4 QH

Provides an overview of eighteenth- and nineteenth-century Western music in cultural and stylistic contexts. Covers some of the best-known figures in classical music: Bach, Mozart, Beethoven, and Wagner. Considers why and how the great tradition of tonal music defines classical music even today. Uses scores to help understand the different ways music can be written and the different aesthetic definitions of beauty, pleasure, and meaning in sound. *Prereq.* *MUS 1421.*

MUS 1424 Historical Traditions 4 4 QH

Provides an overview of Western classical music in the twentieth century. Concentrates on classical music but also deals with music as a living language related to other kinds of music and other arts and made by people for different reasons. Focuses on both style, often of one great figure, and topic. Looks for parallels between classical music and the other arts and popular musics as well. *Prereq.* *MUS 1421.*

MUS 1461 Applied Music Lessons 3 QH

Provides advanced individual instruction in voice or on modern and early instruments. May be repeated for credit. Available only to upperclass students concentrating in music literature and performance. *Prereq.* *Permission of instructor and department chair.*

MUS 1700 Introduction to Music (Honors) 4 QH

Honors equivalent of MUS 1100.

MUS 1709 Introduction to Music and the Arts (Honors) 4 QH

Honors equivalent of MUS 1109.

MUS 1800, MUS 1801, MUS 1802, MUS 1803, MUS 1804, MUS 1805 Directed Study 4 QH each

Focuses independent work in a selected area of music under the direction of one member of the department. Limits enrollment to qualified students by special arrangement with the supervising faculty member and with the approval of the department chair.

MUS 1810, MUS 1811, MUS 1812, MUS 1813 Junior/Senior Honors Project 4 QH each

For details contact the honors office.

Courses at the New England Conservatory

Qualified students will be able to take selected courses at the New England Conservatory of Music. Regular academic credit will be granted. For information, contact the chair of the department.

Philosophy and Religion

PHL 1100 Introduction to Philosophy

4 QH

Introduces students to philosophy by acquainting them with the theories and arguments of classical and contemporary philosophers and by teaching the skills of constructing and analyzing arguments. Emphasizes philosophical inquiry. Covers typical areas such as questions about the basis of morality, free will versus determinism, the existence of God, the problem of suffering, and the nature of knowledge. (II)

PHL 1110 Introduction to Religion

4 QH

Seeks to identify and appraise different ways of being religious: primitive, mystical, dogmatic, and ritual. Emphasizes appreciating the unique standpoint that each requires, how each sees the world in a radically different way, and how that leads to distinctive ways of life. (II)

PHL 1130 Ethics: East and West

4 QH

Explores claims in both Eastern and Western philosophy that a way of life exists that leads to happiness, power, and wisdom. Studies the thought of such philosophers as Socrates, Buddha, Plato, Aristotle, Lao Tzu, Epictetus, Marcus Aurelius, Aquinas, and Spinoza, as well as by studying some of the classical Hindu and Buddhist texts. (V)

PHL 1135 Philosophical Problems of Law and Justice

4 QH

Focuses on two general questions: What is the proper scope of the law? And how should the law be enforced? Under the first question, deals with a number of issues such as whether the law has a legitimate right to restrict such activities as the use of drugs, deviant sexual practices, or gambling. Under the second question deals with the justification of punishment, rehabilitation as an alternative to punishment, and the death penalty. (VI)

PHL 1140 Social and Political Philosophy

4 QH

Focuses on basic questions about the nature of the state and the relationship of individuals to the state. What basis is there for individuals to obey the laws of the state? What conditions must a government meet to be legitimate? What justification can be given for democratic forms of government? What sorts of controls should the state exert over citizens? What benefits do citizens have a right to expect from the state? Includes readings from both classical and contemporary sources. (V) *Prereq.* 4 QH *philosophy.*

PHL 1145 Technology and Human Values

4 QH

Examines the changing values of the modern, technologically advanced world. Attempts to increase our understanding of the supposed breach between the literary and scientific cultures, the diverse approaches toward their reconciliation, and the human dimensions of science and technology. Considers other relevant topics such as the neutrality of technology with respect to good or evil uses, technology as an instrument for human liberation, and the issue of proper and effective modes of controlling technology in today's world. Studies Pirsig's widely read paperback, *Zen and the Art of Motorcycle Maintenance*, as well as Lynn White's *Dynamo and Virgin Reconsidered*. Also considers other important writers, including Kurt Baler, Jacob Bronowski, Barry Commoner, Erich Fromm, Karl Marx, and C. P. Snow. (VI)

PHL 1155 The Ethics of Human and Animal Experimentation

4 QH

Explores the conflicts that arise between the value of free scientific inquiry on the one hand and the rights, vulnerabilities, and

suffering of human and animal subjects on the other. Considers traditional issues involving informed consent, voluntariness, coercion, experimental design, risk-benefit analyses, institutional review boards, and professional guidelines, as well as such less traditional issues as the competing conceptions of progress, whether we have obligations to nonhuman animals, and what, if anything, justifies us in treating animals in ways in which we know we should not treat humans. (VI)

PHL 1160 Ethical Issues of Taxation

4 QH

Explores two basic questions: Is any taxation morally justified? Are there moral grounds for choosing among taxation policies? Covers competing conceptions of private property; the "progressive versus regressive taxation" controversy; the "flat tax" controversy; the alleged problems with interpersonal utility comparisons; and questions involving the distribution of tax monies, e.g., whether those who have more than they need have any moral obligation to provide for the needs of the poor. (VI)

PHL 1165 Moral Problems in Medicine

4 QH

Examines two fundamental ethical systems, one of which is grounded on the dignity of the person, the other on the intrinsic value of happiness. Then explores the difficult issues of euthanasia, suicide, paternalism, medical experimentation, the patient's right to consent to any therapeutic intervention, and the concept of death with dignity. Examines the larger economic and policy issues of justice, some of which are current in political debates (for example: Is there a right to health care?). Encourages the student to become more sensitive to moral problems as they arise in medical settings, to be better able to deal with these troublesome issues, and perhaps to be more courageous in facing them if that becomes necessary. Also offers an investigation into the questions of abortion, euthanasia, infanticide, genetic counseling, psychosurgery, and human experimentation from the standpoint of both philosophical ethics (such as the theory of the end justifying the means) and religious ethics (such as the natural-law theory of the Roman Catholic Church). (VI)

PHL 1180 Ecology Ethics

4 QH

Investigates the Gaia hypothesis, the view that the earth is a self-regulating ecosystem. Focuses on a current ecological crisis, the greenhouse effect, and on one of its major causes, deforestation. Addresses the values that underlie our concern over this and other ecological crises, whether the values at issue are anthropocentric or biocentric. Explores the ethical implications these ecological concerns have for our individual lifestyles, and for our role as members of communities. Explores how we should live as creative, responsible, and fulfilled beings on the planet. (VI)

PHL 1200 Introduction to Logic 1*

4 QH

Introduces the logic of propositions and the syllogism. Examines principles of critical reasoning and fallacies. Provides practice in applying logical techniques to the creation and criticism of argument. (II) *Students with a strong math background should enroll in PHL 1215.*

PHL 1203 Introduction to Logic 2*

4 QH

Continues the study of the techniques of logic in the analysis and creation of argument. Explores the logic of predicates, quantifiers, and relations. Provides practice in applying these techniques to natural arguments. Considers the forms of definition and the evaluation of empirical generalizations. (Overlaps PHL 1215.) (II)

*Students should take either PHL 1200 and PHL 1203 or PHL 1200 and PHL 1215. Credit will not be given for all three courses.

PHL 1215 Symbolic Logic***4 QH**

Focuses on the syntax and semantics of propositional logic and first order quantification theory. Considers relations between these systems and natural language. Covers analysis of the notion of derivation within a system, the notion of logical consequence, and practice in analyzing logical structure in natural language sentences. (II) *Recommended for students with a strong math background.*

PHL 1225 Ancient Philosophy**4 QH**

Explores classical Greek philosophy; starts with a study/discussion of the roots of Western thought in the sixth century B.C. and argues the reasons for our debt to these original thinkers who were concerned with explaining the principles of external nature and the problems of human knowledge and conduct. Studies Socrates and his adversaries, the Sophists, and the two major figures he influenced: Plato and Aristotle. Also covers Roman philosophy, the Stoics, and the Sceptics, who are a prelude to the early Christian philosophers of the first century A.D. Places attention on the interplay between philosophers and the moral, social, and religious context in which their thought arises. Emphasizes student participation in class discussion. (III)

PHL 1230 Modern Philosophy**4 QH**

Explores the 100 years between 1650 and 1750, sometimes called "the century of genius," a period in which philosophers reacted to the new scientific discoveries of Copernicus, Kepler, and Galileo. Focuses on the development of the rationalist and empirical philosophies during this period, with emphasis on Descartes, Leibniz, Spinoza, Locke, Berkeley, and Hume. (III) *Prereq. 8 QH philosophy.*

PHL 1243 Existentialism**4 QH**

Examines existentialist philosophy in its greatest representatives, such as Kierkegaard, Nietzsche, Dostoevski, Heidegger, Jaspers, and Camus, with major attention given to Jean-Paul Sartre and Maurice Merleau-Ponty. Focuses on central themes, including self-alienation, unauthenticity, authenticity, and existential experiences. Examines existential philosophy in its historical, social, and cultural relations, and in its influence on psychology, psychoanalysis, sociology, political science, and literature, both in Europe and in the United States. *Prereq. 4 QH philosophy.*

PHL 1245 Analytic Philosophy**4 QH**

Traces the development of the analytic movement from its beginnings in the early works of Moore and Russell. Provides some treatment of Russell's logical atomism, the logical positivists, the thought of Ludwig Wittgenstein, and their widespread influence. *Prereq. 8 QH philosophy.*

PHL 1250 Chinese Philosophy**4 QH**

Examines Chinese philosophy in the ancient period (until 221 B.C.). Emphasizes Confucianism, Taoism, and the *I Ching*. Also covers the Logicians, the Mohists, and the Legalists.

PHL 1255 Indian Philosophy**4 QH**

Examines the two classical Indian philosophical systems of Hinduism and Buddhism. In examining Theravada Buddhism, explores the view that it is possible for us to live without anxiety or suffering if we overcome our ignorance of reality and master our desires. Next, explores Mahayana Buddhism and its ethics of compassion and its related metaphysics of "voidness." In this part of the course, examines questions that, in the West, are thought

of as questions about personal identity and the nature of the self. In exploring Hinduism, studies Vedic mysticism as it comes to us through the Upanishads, as well as the influential ethics of the Bhagavad Gita. Examines the question of whether the method of yoga and meditation is a reasonable method for learning about the fundamental nature of reality.

PHL 1275 Eastern Religions**4 QH**

Explores the fundamental nature of reality. The course first tries to make sense of the difficult notion that the way we perceive reality may be illusory. Examines Theravada Buddhism, a religion that rests on the insights that everything is impermanent and that it is possible to live fully in the present without any suffering. From Theravada Buddhism, the course turns to Mahayana Buddhism, and then to Taoism, a subtle view that emphasizes the "flow" of life and that "the way to do is to be." Next, the Hinduism of the Upanishads is examined. As part of the exploration of this form of Hinduism, students are given the opportunity to examine meditation intellectually and also to practice a few methods of meditation. In addition, the course investigates the devotional aspect of Hinduism as expressed in the Bhagavad Gita. There will also be an exploration of Zen. (IV)

PHL 1280 Islam**4 QH**

Explores the history of Islam, its past and current conflicts with the West, Islamic beliefs, the future of Islam as a world religion, and relations of Islam with Christianity and Judaism. Examines social, political, and legal issues, as well as with the more familiar religious and theological questions. (IV)

PHL 1285 Introduction to Jewish Religion and Culture**4 QH**

Explores the basic features of Judaism in the ancient, Rabbinic and Modern periods. Employs an historical critical approach to the formative texts and their interpreters. Analyzes Jewish practices within specific historical contexts and discusses the ways in which practices relate to the texts and history of Judaism. Examines the rich varieties of Jewish cultural expressions.

PHL 1290 Cults and Sects**4 QH**

Examines the varieties of religious experience from the perspectives of sociology and psychology of religion. Focuses on such cultic and sectarian groups as Christian Science, the American Shakers, the Unification Church, the Hare Krishna movement, and the Black Muslims. Provides the student the opportunity to acquire critical investigative tools with which to analyze different religious expressions.

PHL 1295 Medicine, Religion, and the Healers' Art**4 QH**

Explores aspects of the historical, religious, and cultural context for contemporary alternatives in health care, beginning with an examination of several examples of traditional healing practices and their accompanying religious and philosophical views about human life. Explores this "holistic" tradition in two frames of reference: the ascendancy of scientific rationalism over religion and the takeover, by male-dominated professions, of healing functions that society has traditionally assigned to women (e.g., the rise of obstetrics and the suppression of midwifery). Gives special attention to major women healers of the nineteenth century. Looks at some contemporary efforts at reintegration of scientific and traditional values in the modern health care system. Gives students the opportunity to meet and interact with patients and healers active in the modern holistic health movement.

*Students should take either PHL 1200 and PHL 1203 or PHL 1200 and PHL 1215. Credit will not be given for all three courses.

PHL 1315 Understanding the Bible**4 QH**

Introduces students to the Old and New Testaments, so that they can enter into a dialogue with the Bible, understanding not only what it says, but why it is said that way. Focuses on the Bible's social, political, and cultural backgrounds. (III)

PHL 1320 The Meaning of Death**4 QH**

Offers an inquiry into different philosophical and religious perspectives on death and life after death, including an examination of some powerful contemporary accounts of personal confrontation with death, along with investigations into attitudes toward death in other traditions for example, Hinduism and Buddhism. In addition, explores responses to the Holocaust in Europe and theories about life after death (such as those discussed in Raymond Moody's *Life After Life* and Ian Stevenson's *Reincarnation*). (V)

PHL 1335 Moral Philosophy**4 QH**

Explores two basic questions: What sorts of things are good and bad? What actions are right and wrong? Covers major classical conceptions of ancient Greece and Rome, their replacement by the Western religious ethic, its modification and rejection in the early modern period, and the emergence of modern versions of traditional conceptions of the good life, with reflections on the nature of ethical inquiry itself as a legitimate study. *Prereq.* 4 QH philosophy or religion or permission of instructor.

PHL 1340 Aesthetics**4 QH**

Offers a historical approach to aesthetics, the philosophical analysis of concepts and the solution of problems that arise when one contemplates beautiful (or ugly) objects. Also explores standards of value in judging art by asking the following questions: What features make objects beautiful (or ugly)? Are there aesthetic standards? What is the relation of works of art to nature? What is the nature of an aesthetic experience? *Prereq.* 4 QH philosophy.

PHL 1345 Philosophy of Religion**4 QH**

Asks the basic question, "Does God exist?" Examines several major arguments affirming and criticizing the notion of God's existence. Explores a central problem in recent philosophy of religion of whether or not it makes any sense to speak of the truth (or falsity) of religious belief, as well as the implication an answer to that issue has for religious life. *Prereq.* 4 QH philosophy.

PHL 1350 Philosophy of Human Nature**4 QH**

Offers a philosophical inquiry into the theories of man, man's dimensions, and human nature. Examines the question of the existence of human nature. Pays special attention to contemporary theories of man and self-alienation and their influence in social sciences. Includes selected readings from Descartes, Hobbes, Hegel, Marx, Kierkegaard, Maritain, Freud, Skinner, Fromm, and Frankl.

PHL 1360 Philosophy and Literature**4 QH**

Provides the student the opportunity to learn to recognize, appreciate, and criticize philosophical themes in literature. Includes readings from acknowledged classics by philosophical authors such as Voltaire, Dostoevski, and Sartre; popular contemporary authors such as Vonnegut, Barth, and Pynchon; and readings from more straightforward philosophical sources. Examines the meaning of life, the human condition, depersonalization, alienation, human freedom, questions of value, responsibility, rationality, and personal identity. Explores religious, nihilistic, existential, and other viewpoints.

PHL 1370 The Meaning of Life**4 QH**

Examines selected philosophical problems of human existence in the contemporary world, with major emphasis on the search for identity and self-fulfillment. Discusses selected problems such as freedom, death, sexuality, alienation, becoming a person, and peak experiences. Includes readings from Kierkegaard, Heidegger, Sartre, Camus, Maslow, Allport, Frankl, Rogers, and Rollo May.

PHL 1375 Freud, Skinner, and Their Critics**4 QH**

Examines fundamental themes and concepts of Freud's psychoanalysis and Skinner's psychology from a philosophical perspective and criticisms of them from the point of view of reformed Freudians and existentialists. Includes selections from Freud, Jung, Adler, Karen Horney, Skinner, Koestler, Pearls, Sartre, Merleau-Ponty, and Kovaly. *Prereq.* 4 QH philosophy or permission of instructor.

PHL 1400 Theory of Knowledge**4 QH**

Introduces epistemology, or theory of knowledge, which asks the following questions: What is knowledge? Is knowledge (or even certainty) attainable? What are the limitations of human knowledge? How is knowledge—if we have it—acquired? What roles do reason and experience play in the attempt to attain knowledge? Studies both classical (Rene Descartes and David Hume) and contemporary sources (Bertrand Russell and others). Examines and criticizes various theories of knowledge, such as empiricism, rationalism, and scepticism. Encourages students to form at least tentative opinions on these issues. *Prereq.* 4 QH philosophy or permission of instructor.

PHL 1405 Metaphysics**4 QH**

Considers central problems and theories concerning the nature of reality, with special attention to such areas as the relation between mind and matter, free will and determinism, and criteria of existence. *Prereq.* 8 QH philosophy.

PHL 1410 Philosophy of Science**4 QH**

Focuses on the nature of scientific method, scientific theories, and scientific explanations. Examines the central question of why science is thought to provide the most reliable account of the nature of reality. Considers various theories about the nature and reliability of science. *Prereq.* 4 QH philosophy.

PHL 1415 Advanced Logic**4 QH**

Studies the major results in the meta-theory of first order logic. Examines consistency, completeness, and decidability. Discusses the general notion of an effectively computable process, Church's thesis, and the existence of unsolvable problems. *Prereq.* PHL 1215.

PHL 1435 Philosophy of Mind**4 QH**

Seeks to show what puzzles and problems result from an honest attempt to answer these questions in a reasonable way: What is the relation between mind and body? Is the mental merely a function of bodily process and behavior, or does it somehow exist "over and above" the material? How are self-knowledge and knowledge of other minds achieved? What is the relation between words and thoughts? Examines classical sources, such as Descartes and Locke, and contemporary sources, such as Wittgenstein and Putnam. Also seeks to arrive at some answers—however tentative or provisional—to these questions. Constantly challenges the student to think and write well about these difficult subjects. *Prereq.* 4 QH philosophy.

PHL 1440 Philosophy of Language 4 QH
Examines prospects for a theory of language, its syntax, and its semantics. Examines contrasts between theory of reference and theory of meaning. Asks whether there are universals of language. Analyzes relations between linguistics and psychology. Includes readings from Frege, Quine, Russell, Chomsky, and Fodor.
Prereq. Permission of instructor.

PHL 1550, PHL 1551, PHL 1552, PHL 1553 4 QH each
Junior/Senior Honors Project
For details Contact the honors office .

PHL 1700 Introduction to Philosophy (Honors) 4 QH
Honors equivalent of PHL 1100.

PHL 1740 Social and Political Philosophy (Honors) 4 QH
Honors equivalent of PHL 1140.

PHL 1800 Directed Study 4 QH
Those interested in the directed study program should meet with the department chair. *Prereq. permission of instructor.*

PHL 1888 Great Philosophers Seminar 4 QH
Focuses on the writings of a major philosopher. Subjects include Plato, Aquinas, Locke, Hegel, and Heidegger. *Prereq. 12 QH of philosophy courses.*

PHIL 1890 Seminar in Religion 4 QH
Examines topics including theodicy, cosmogeny, contemporary issues in religion, and comparative ethics. *Prereq. 12 QH of philosophy and religion courses.*

PHL 1891 Major Figures in Religious Studies 4 QH
Focuses on the work of one figure important in the field of religion. Subjects include Augustine, Calvin, Luther, Weber, and Eliade. *Prereq. 12 QH of religious studies.*

PHL 3265 Issues in Medical Ethics 4 QH
Focuses on issues in medical ethics, especially as they are likely to arise in a clinical setting. Begins with exploration of the two basic systems of ethical theory and then concentrates on their application in cases exemplifying the issues of euthanasia, paternalism, experimentation, informed consent, quality of life, professional responsibility, right to health care, truth telling, genetic control, abortion, and the allocation of scarce medical resources. *Prereq. Permission of instructor.*

Physics

Courses are listed according to level and degree of specialization. General interest courses have no prerequisites and may be used to satisfy College of Arts and Sciences distribution requirements in science. Introductory physics courses are basic first-year physics lecture courses; the corresponding labs are listed under "Introductory Physics Laboratories." Advanced physics and astronomy courses require one year of introductory physics and may be used to satisfy degree requirements for physics majors.

General Interest Courses

PHY 1111 Introduction to Astronomy 1 4 QH
Offers the nonscience student an introduction to modern astronomical ideas. Includes such topics as introduction to the cosmos;

tools of the astronomer (atoms, the nature of light and radiation, telescopes, space astronomy); the earth in space; our solar system (origin and future of the solar system, the planets and other bodies, the latest from spacecraft flights, the sun as our bridge to the stars); the question of life in the universe. (II)

PHY 1121 Introduction to Science 1 4 QH
Provides for nonscience majors an interdisciplinary treatment of the basic ideas of the natural sciences. Discusses concepts such as energy, gravity, and the atom, followed by a consideration of the ways in which atoms combine to form the substances that comprise matter. (II)

Introductory Physics Courses

PHY 1191 Physics for BSET 1 4 QH
Focuses on units and scientific notation, force, Newton's first law, static equilibrium, Newton's second law, momentum, work, kinetic energy, potential energy. *Prereq. MTH 1191, which may be taken concurrently; BSET majors only.*

PHY 1192 Physics for BSET 2 4 QH
Focuses on power, rotational motion, Pascal's law, hydrostatic pressure, molecular mass, ideal gas law, first and second laws of thermodynamics, simple harmonic motion, wave motion, sound, and light. *Prereq. PHY 1191; MTH 1192, which may be taken concurrently; BSET majors only.*

PHY 1193 Physics for BSET 3 4 QH
Focuses on electrostatics, circuit elements, direct current circuits, magnetism, electromagnetic induction, electromagnetic waves, atomic and nuclear physics. *Prereq. PHY 1192; BSET majors only.*

PHY 1201 Physics for the Life Sciences 1 4 QH
Focuses on vector addition of force, principles of statics; Newton's second law, kinetic and potential energy; pressure static properties of fluids, fluid flow. To take the lab for this course, register for PHY 1501 concurrently. (II)

PHY 1202 Physics for the Life Sciences 2 4 QH
Focuses on wave motion, sound, light, optics, static electricity, DC circuits, magnetism. To take the lab for this course, register for PHY 1502 concurrently. (II) *Prereq. PHY 1201.*

PHY 1203 Physics for the Life Sciences 3 4 QH
Focuses on temperature, gas laws, properties of liquids (surface tension and osmotic pressure), properties of solids, thermal physics, Coulomb's law, and atomic and nuclear physics. *Prereq. PHY 1202.*

PHY 1221 Physics for Science and Engineering Students 1 4 QH
The first quarter of a four quarter sequence intended primarily for engineering students, covers mechanics, kinematics, dynamics, Newton's laws, work, energy, linear momentum, collisions. *Prereq. MTH 1123 or equiv., which may be taken concurrently.*

PHY 1222 Physics for Science and Engineering Students 2 4 QH
Continues PHY 1221. Focuses on rotational equilibrium, harmonic motion, and electrostatics (including DC circuits). *Prereq. MTH 1124 or equiv. and PHY 1221, which may be taken concurrently.*

PHY 1223 Physics for Science and Engineering Students 3 4 QH
Focuses on magnetic fields, Maxwell's equations, waves, sound, and electromagnetic waves. *Prereq.* MTH 1125 or equiv. and PHY 1222, which may be taken concurrently.

PHY 1224 Physics for Science and Engineering Students 4 4 QH
Focuses on physical optics, special relativity, photoelectric effect, Compton scattering, and quantum mechanics (including the uncertainty principle, the Schrodinger equation, wave functions, the hydrogen atom, solids, nuclear and atomic physics). *Prereq.* PHY 1221, PHY 1222, and PHY 1223 or equiv.

PHY 1252 Physics Review 1 QH
Offers a calculus-based review for students who have had previous college physics courses not equivalent to the engineering sequence of PHY 1221 through PHY 1224. Covers fundamentals of mechanics, electricity, and magnetism. *Prereq.* One year of college physics and knowledge of elementary calculus.

Introductory Physics Laboratories

PHY 1196 Physics BSET Laboratory 1 1 QH
Covers experiments from various physics topics covered in PHY 1191. Lab fee. *Prereq.* PHY 1191 concurrently; BSET majors only.

PHY 1197 Physics BSET Laboratory 2 1 QH
Covers experiments from various physics topics covered in PHY 1192. Lab fee. *Prereq.* PHY 1196; PHY 1192 concurrently; BSET majors only.

PHY 1198 Physics BSET Laboratory 3 1 QH
Covers experiments from PHY 1193. Lab fee. *Prereq.* PHY 1193 concurrently; BSET majors only.

PHY 1501 Physics Laboratory for the Life Sciences 1 1 QH
Accompanies PHY 1201. *Prereq.* PHY 1201 concurrently.

PHY 1502 Physics Laboratory for the Life Sciences 2 1 QH
Accompanies PHY 1202. *Prereq.* PHY 1501; PHY 1202 or PHY 1203 concurrently.

PHY 1521 Physics Laboratory for Science and Engineering Students 1 1 QH
The first of a two-quarter lab sequence in which the student performs experiments from various fields of physics. PHY 1221 concurrently.

PHY 1522 Physics Laboratory for Science and Engineering Students 2 1 QH
Continues PHY 1521. *Prereq.* PHY 1521; PHY 1222 concurrently.

PHY 1533 Physics Laboratory for Science Majors 3 1 QH
Focuses on lab experiments related to topics covered in PHY 1233. *Prereq.* PHY 1522; PHY 1223 concurrently.

Advanced Physics and Astronomy Courses

PHY 1301 Intermediate Mechanics 4 QH
Focuses on classical mechanics in two and three dimensions; a review of Newton's laws; special emphasis on conservation theorems for energy, momentum, and angular momentum; harmonic and wave motion. *Prereq.* PHY 1232 and PHY 1233; MTH 1243 concurrently.

PHY 1302 Electric and Magnetic Fields 4 QH
Focuses on the basic concepts of electric and magnetic fields, including electric and magnetic fields in free space and materials; Maxwell's equations in integral form. *Prereq.* PHY 1301; MTH 1244 concurrently.

PHY 1303 Modern Physics 4 QH
Reviews experiments demonstrating the atomic nature of matter, the properties of the electron, the nuclear atom, the wave-particle duality, spin, and the properties of elementary particles. Discusses, mostly on a phenomenological level, such subjects as atomic and nuclear structure, properties of the solid state, and elementary particles. *Prereq.* PHY 1233, PHY 1224, or equiv.

PHY 1304 Mathematical Physics 4 QH
Reviews linear algebra and vector calculus, special functions and partial differential equations of physics, potential theory, functions of a complex variable. *Prereq.* MTH 1244 and PHY 1233; MTH 1246 concurrently.

PHY 1305 Thermodynamics and Kinetic Theory 4 QH
Focuses on first and second laws of thermodynamics, entropy and equilibrium, thermodynamic potentials, elementary kinetic theory, statistical mechanics and the statistical interpretation of entropy. *Prereq.* PHY 1224 or PHY 1233, and MTH 1244.

PHY 1401 Classical Mechanics 4 QH
Covers advanced topics in classical mechanics, including vector kinematics, harmonic oscillator and resonance, generalized coordinates, Lagrange's equations, central forces and the Kepler problem, rigid body motion. *Prereq.* PHY 1301 and MTH 1245.

PHY 1402 Electricity and Magnetism 1 4 QH
Covers Maxwell's equations and their experimental basis, electrostatics and magnetostatics, the electromagnetic field in empty space, electromagnetic waves. *Prereq.* PHY 1302, and PHY 1304 or equiv.

PHY 1403 Electricity and Magnetism 2 4 QH
Continues PHY 1402. Focuses on energy and momentum in the electromagnetic field, electrodynamics, the interaction of matter and the field, radiation. *Prereq.* PHY 1402 or equiv.

PHY 1404 Wave Motion and Optics 4 QH
Focuses on harmonic and coupled oscillators, wave equation; geometrical and physical optics; interference, diffraction, optics of solids, amplification of light; and lasers. *Prereq.* PHY 1302.

PHY 1411 Introduction to Astrophysics and Cosmology 4 QH
Introduces the student to current ideas in astrophysics and cosmology, with emphasis on recent advances in this field. Focuses on tools of the astronomer (gamma-, X-, UV-, optical-, infrared-, radio-telescopes, spectrometers, spacecrafts, and so on); solar system; stellar properties (site luminosity); stellar spectra; Hertzsprung-Russell diagram; stellar energy sources (gravitational, nuclear); evolution of stars (birth, main sequence, red giants, white dwarfs, planetary nebulae, supernovae, neutron stars and pulsars, black holes and gravitational collapse); methods of interstellar and intergalactic distance measurement; our Milky Way galaxy; extragalactic objects (galaxies, clusters of galaxies, radio galaxies, quasars); cosmology (Olber's paradox, recession of galaxies, big bang theory, cosmic background radiation, formation of galaxies, the future of the universe). *Prereq.* Three quarters of elementary physics.

PHY 1413 Introduction to Nuclear Physics 4 QH

Focuses on nuclear structure, nuclear masses, radioactivity, nuclear radiation, interaction of radiation and matter, detectors, fission, nuclear forces, elementary particles. *Prereq. PHY 1303.*

PHY 1414 Introduction to Solid State Physics 4 QH

Offers a semiclassical treatment of the thermal, magnetic, and electrical properties of crystalline solids. Examines X-ray diffraction and the reciprocal lattice, elasticity and lattice vibrations, specific heat, properties of insulators, magnetism in insulators and metals, and introduction to the band theory of metals. *Prereq. CHM 1383 or PHY 1303; and PHY 1305 or equiv.*

PHY 1415 Quantum Mechanics 1 4 QH

Focuses on observation of macroscopic and microscopic bodies, the uncertainty principle, wave-particle duality, probability amplitudes, Schrodinger wave theory, and one-dimensional problems. *Prereq. CHM 1383 or PHY 1303; and PHY 1304 or equiv.*

PHY 1416 Quantum Mechanics 2 4 QH

Continues PHY 1415. Covers discrete and continuous states, Schrodinger equation in three dimensions, angular momentum, general theory of quantum mechanics, applications. *Prereq. PHY 1415.*

PHY 1551 Electronics for Scientists 1 4 QH

With PHY 1552, forms a two-quarter sequence covering electronic techniques for experimental research in many different fields of science. Focuses on principles of semiconductor devices; analog techniques (amplification, feedback, integration); digital techniques (counting, multiplexing, logic); design of electronic subsystems (analog-to-digital converters, phase-sensitive detectors, data-logging systems); understanding specifications of commercial electronic equipment. In lab examples, makes use of up-to-date integrated and discrete devices such as are currently used in the electronic industry.

PHY 1552 Electronics for Scientists 2 4 QH

Continues PHY 1551. *Prereq. PHY 1551.*

PHY 1555 Wave Laboratory 4 QH

Offers a general treatment of the problems of mechanical and electromagnetic radiation as wave phenomena. Focuses on the differential wave equation and its application to selected topics; interference and diffraction theory from the standpoint of the Huygens-Fresnel and Kirchhoff formulations; selected experiments in acoustics, optics, and microwaves to illustrate these problems. *Prereq. PHY 1224 or PHY 1302.*

PHY 1557 Advanced Physics Laboratory 4 QH

Presents special projects in modern experimental physics, including electronic instrumentation used in measuring physical quantities and use of microprocessors. *Prereq. PHY 1551 and PHY 1552.*

PHY 1561 Project Laboratory 4 QH

Allows students to select and carry out individual projects involving instrumentation and computation. Involves the development of some aspect of instrumentation and/or computation in an ongoing research project and the preparation of a final report. The student will be supervised by the project leader and the course instructor. (Although the course carries 4 QH credit, it is taken in successive winter and spring quarters.) *Prereq. Permission of instructor.*

PHY 1711 Introduction to Astronomy 1 (Honors) 4 QH

Honors equivalent of PHY 1111.

PHY 1721 Physics 1 4 QH

Honors equivalent of PHY 1221.

PHY 1722 Physics 2 4 QH

Honors equivalent of PHY 1222.

PHY 1723 Physics 3 4 QH

Honors equivalent of PHY 1223.

PHY 1724 Physics 4 4 QH

Honors equivalent of PHY 1224.

PHY 1885, PHY 1886, PHY 1887, PHY 1888 4 QH each

Junior/Senior Honors Project

For details contact the honors office.

Political Science

POL 1110 Introduction to Politics 4 QH

Offers an overview of basic concepts such as power, authority and sovereignty, methods of political analysis, and contemporary political ideologies. Discusses such dynamics as political culture, public opinion and participation, and political systems. (II)

POL 1111 Introduction to American Government 4 QH

Analyzes the American system of government and politics. Includes the philosophical origins and design of the Constitution, public opinion, political behavior and participation, parties and interest groups, and formal governmental institutions. May cover cases in domestic and foreign policymaking. (II)

POL 1112 Introduction to International Relations 4 QH

Applies basic theories of international relations to examining the foreign policies of the key actors in the international system. Covers topics of international aid, trade, and monetary affairs; issues relating to the arms race, nuclear proliferation, arms control, and disarmament; international law and organizations, human rights, and the impact of technology on the functioning of the international system. (II)

POL 1113 Introduction to Foreign Governments 4 QH

Presents a comparative study of political organization and behavior in selected countries. Includes such topics as political economy, leadership, political institutions, political culture, and political participation.

POL 1114 Introduction to American Constitutional Law 4 QH

Introduces the U.S. Constitution by exploring its theory, its origin, and the institutions by which it bestows and restrains power. Surveys the constitutional liberties guaranteed. Examines what this fundamental supreme United States law means today, two centuries after its ratification. Other topics include congressional areas of policy-making responsibility, presidential power, the role of the judiciary in the American system of government, and the reconciliation of majority rule with minority rights.

POL 1260 Public Policy Analysis 4 QH

Uses both theoretical literature and case studies to analyze the structure of and dynamics inherent in the American policymaking process. Introduces such concepts as problem definition, agenda-development, policy formation, implementation, and program evaluation. Examines basic policy analysis methods. (VI)

POL 1261 Public Administration**4 QH**

Focuses on the theory and practice of public administration, emphasizing the generalities of institutions, processes, and behavior of bureaucratic organizations.

POL 1262 Organization Theory**4 OH**

Provides a broad overview of organization theories, their history, and development. Gives specific attention to developing a paradigm for public organizations that focuses on the relationships of economic, democratic, bureaucratic, technological, and humanistic imperatives. Requires the student to prepare a research paper and consider the implications of this paradigm for future organizations.

POL 1266 Public Personnel Administration**4 QH**

Presents an overall introduction to the field of public personnel administration. Examines selected topics such as recruitment, selection, classification, case development, equal opportunity, public employee unionism, and collective bargaining.

Prereq. POL 1261.

POL 1267 Public Budgeting**4 QH**

Focuses on the function of budgeting in a variety of governmental contexts, specifically, the appropriations process, the budget as a management tool, and the public policy impacts of the budget. Emphasizes budgeting techniques within this context. *Prereq.* POL 1261.

POL 1301 Research Methods 1**4 QH**

Offers an introduction to the principal quantitative methods used in political analysis, public administration, political behavior, international relations, and policy sciences. Emphasizes basic statistical techniques, survey methods, and SPSS programming. *Prereq.* *Middler standing or above, or permission in instructor.*

POL 1302 Research Methods 2**4 QH**

Focuses on methods of quantitative analysis. Covers the following primary statistical topics: significance testing, bivariate regression and correlation, and multiple regression and correlation. In addition, teaches elementary computer skills and the use of the programming language Statistical Package for the Social Sciences (SPSS) to calculate advanced statistics. Emphasizes the practical application and understanding of statistical techniques by providing numerous examples in the areas of political behavior, public opinion, and public policy analysis. *Prereq.* POL 1301 and *middler standing or above, or permission of instructor.*

POL 1303 Political Behavior**4 QH**

Examines selected topics in contemporary political science from a political behavior perspective. Focuses on political attitude formation and change, ideology, socialization, public opinion and voting behavior, political campaigning, political violence, and empirical democratic theory.

POL 1304 Practical Politics**4 QH**

Accentuates and systematically treats some of the problems of organizing for effective citizen action, partisan and nonpartisan, at the grass-roots level. Explores roles in political campaigning.

POL 1306 Politics in Western Europe**4 QH**

Offers a comparative analysis of political culture, federal and unitary forms of government, and executive-legislative relations on the national level in England, France, Germany, and other European states. Addresses critical issues confronting these

states including European political and economic integration, the role of NATO, immigration, and nationalism. (III)

POL 1308 The Politics of Poverty**4 QH**

Explores what is referred to as the poverty system: how and why there is poverty, how it affects people's lives, and how it can be eliminated. As a discussion-centered course, relies on simulations, small-group work, and experience-based learning; examines the relations between poverty, racism, and the economic, political, and administrative systems. Evaluates a number of alternatives and provides an opportunity for clarifying individual assumptions and feelings about poverty.

POL 1309 International Political Economy**4 QH**

Focuses on international political and economic relations. Examines how nations interact in such areas as trade, finance, and labor relations. Includes such topics as the International Monetary Fund, multinational corporations, economic sanctions, military interventions, technology transfer, and foreign aid. *Prereq.* *A course in either economics or international politics is recommended, but not required.*

POL 1310 American Ideology**4 QH**

Analyzes the main American ideologies, including liberalism, neoliberalism, conservatism, neoconservatism, and nationalism. Examines the historic roots of each ideology and its impact on American politics. Explores the ongoing interaction of political ideology and the political process in contemporary American society. (V) *Prereq.* *Middler standing or above, or permission of instructor.*

POL 1312 Politics and the Mass Media**4 QH**

Analyzes several facets of the mass media: the role of newspapers, radio, and television in public opinion formation; their use and effectiveness in political campaigns; their objectivity and/or bias in reporting the news; their impact on political parties and the distribution of power between Congress and the President.

POL 1313 International Organization**4 QH**

Focuses on development of international organizations with special emphasis on the United Nations system.

POL 1314 Interest Groups and Public Policy**4 QH**

Surveys the roles of organized interests in American public policy-making. Examines why groups are formed, how they work, why they succeed or fail, and what cumulative impacts groups have on policy. Spans a variety of groups, from traditional economic interests to social movements, public interest organizations, and professional lobbyists.

POL 1316 Contemporary Revolutionary Politics**4 QH**

Examines political development in selected revolutionary societies, including Cuba. (VI)

POL 1317 Law and Society**4 QH**

Examines the sociological understanding of legal phenomena. Places special emphasis on the role of law in promoting cultural and social cohesion in American society.

POL 1318 State and Local Government**4 QH**

Introduces students to the political and administrative context of state and local government and surveys the structure, function, and politics of states and localities within the context of the United States federal system. *Prereq.* POL 1111.

- POL 1319 Government and Politics of Massachusetts** 4 QH
Emphasizes the political and administrative aspects of government in Massachusetts. Considers the structure and functions of state government as well as major policy problems confronted by public officials. Analyzes the relationship between state and local governments in Massachusetts. *Prereq.* POL 1111.
- POL 1320 Parties and Elections** 4 QH
Analyzes political parties and the American system of elections. Focuses on structural and constitutional biases, the organizational aspects of the parties, mass voting behavior, the impact of elections on public policymaking, and national and state historical trends.
- POL 1322 World Politics** 4 QH
Emphasizes various principles, techniques, and patterns that governments have followed to implement their goals or objectives. Uses a case study approach, with an emphasis on the problems associated with the Middle East analyzed from the United States-Soviet and Arab-Israeli viewpoints.
- POL 1324 Urban Politics** 4 QH
Analyzes the political, administrative, economic, and social dynamics of urban areas from a historical perspective.
- POL 1327 Gender Politics** 4 QH
Explores the relation between what is and what ought to be—and why—in the roles of women in American politics. Examines the traditional roles of women in politics, the suffrage movement, the woman as citizen and voter, the role of sex in achieving power and in political efficacy, and the place of women in “new politics.” Also covers political action to promote women’s issues and modern feminism. (VI)
- POL 1329 American Social Welfare Policy** 4 QH
Introduces social welfare policy, with emphasis on programs and services in the contemporary United States. Discusses theoretical frameworks for analyzing social welfare policy; then focuses attention on the substantive areas of welfare, mental health, and social security. Explores various issues and processes related to the design, administration, and implementation of social welfare policy in the context of the American socio-political system. Focuses on social welfare policymaking under the Reagan administration.
- POL 1331 Science, Technology, and Public Policy** 4 QH
Considers the effects of science and technology on politics and policymaking in America and how politics influences science and technology. Focuses on the differences between scientific and democratic values and definitions of rationality, the nature of public problems, and why some problems are easier to “solve” than others. Particularly looks at such issues as nuclear power, recombinant DNA, abortion, and medical research; addresses the question of who should decide such complex matters. (VI)
- POL 1332 Government and Politics of Japan** 4 QH
Focuses on the development of Japan’s political system since World War II. Examines Japan’s political institutions and practice of democracy in the context of its political culture; the interrelationship between business and government; Japan’s foreign policy; and business practices and organization. Raises issues concerning Japan’s extraordinary economic success and the limitations of Japan as a model for other countries. (IV) *Not open to freshmen.*
- POL 1334 Environmental Policy & Politics** 4 QH
Examines the policy-making processes, historical and socio-economic factors, political forces, governmental institutions, and global trends that shape environmental policy at national and sub-national levels in the United States. Gives attention to a wide range of environmental policy areas, with comparisons made between the United States and other nations.
- POL 1335 The American Presidency** 4 QH
Examines the presidential electoral process and the constitutional and extraconstitutional powers of the American President. Studies presidential leadership styles and analyzes the relationship between the executive branch and Congress, the Court, the bureaucracy, and the media.
- POL 1336 American Constitutional Law** 4 QH
Employs excerpts of United States Supreme Court decisions and other reading materials to analyze some of the theoretical, structural, and substantive issues inherent in and relevant to the American constitutional system. *Prereq.* POL 1111 and junior or senior standing.
- POL 1337 United States Foreign Policy** 4 QH
Examines formulation and conduct of foreign policy and the United States since World War II.
- POL 1338 Religion and Politics** 4 QH
Explores the role of religion in domestic and international politics. Examines religion as a source of political tension and strife. Draws examples from the United States and the developing world. Covers Islamic fundamentalism in African and the Near East, Orthodox Jewish parties in Israel, Catholic liberation theology in Latin America, and Protestant fundamentalism and the religious right in America.
- POL 1339 Current Political Issues** 4 QH
Analyzes the constitutional and political background of selected contemporary public issues. Primarily for nonpolitical science majors.
- POL 1340 Crisis and Change in Central/Eastern Europe** 4 QH
Studies the rejection of communist party rule in the six former Soviet bloc socialist countries, Albania, and Yugoslavia and examines political, economic, social, and international problems of post-communist development.
- POL 1342 Crisis and Conflict in Black Africa** 4 QH
Using films, maps, news clips, discussions, and readings, explores contemporary politics in African nations south of the Sahara. Studies South Africa, Nigeria, Kenya, and Ethiopia, among others. Examines apartheid, colonialism, Afro-Marxism, chieftaincy, development, and Pan-Africanism. Same as AFR 1342. (VI)
- POL 1343 Politics and Violence in Northern Ireland** 4 QH
Analyzes the causes of violence in Northern Ireland. Considers historical, sociological, and economic roots of the conflict, but places major emphasis on politics. Also discusses the international dimension (the roles of southern Ireland, the United States, and so on), paramilitary organizations, legal political parties and groups, and potential solutions. Draws comparative parallels, including possible lessons for the United States. (IV)
- POL 1345 Government and Politics in the Middle East** 4 QH
Approaches the political, economic, military, and ideological factors within the Arab states and Israel, inter-Arab politics, the Arab-Israeli conflict, and the great power rivalry in the region. (VI)

- POL 1346 Gender, Family, and Politics in the Middle East** 4 QH
Surveys the roles that gender and family play in political, economic, and social issues of the Middle East. Focuses on several political systems to provide a view of the diversity and similarity between various governments and societies. Topics include women in development; the connection between family and political power; women and Islam; legal status of women; and women in liberation movements. *Prereq.* POL 1345 or INT 1150/HST 1490 or permission of instructor.
- POL 1347 Russian Politics After Communism** 4 QH
Presents an analysis of the roots of the collapse of the Soviet Union in 1991 and studies problems of political development after communism. Emphasizes the introduction of democracy, the movement toward a market economy, the reorganization of the military, and the control of inter-ethnic strife.
- POL 1348 Russian Foreign Policy** 4 QH
Presents an analysis of the goals, methods, and achievements of Russian policy in the post-Soviet era toward Eastern Europe, Western Europe, the Middle East, Central and East Asia, and the United States, against the background of Soviet behavior toward these areas in the recent past.
- POL 1350 American Legislative Process** 4 QH
Explores the structures, dynamics, and styles inherent in public policymaking within the U.S. Congress. Focuses on elections; representation of constituents' interests; the roles played by members, the president, interest groups, and other actors; and how all of this is affected by the structure of Congress and the processes embedded in the legislative body.
- POL 1351 Techniques and Practices of Public Management** 4 QH
Focuses on practical skills and techniques of public management. Employs the case method in examining typical management problems at different levels of government. Also covers time and resource management for public sector managerial personnel.
- POL 1353 Law and Personal Morality** 4 QH
Examines the use of political power to enforce standards of personal morality and behavior in contemporary American society. Considers such subjects as pornography, sexual privacy and expression, Sunday closing laws, abortion, and prostitution.
- POL 1362 Civil Liberties** 4 QH
Uses United States Supreme Court decisions and other reading material to examine the substantive and procedural guarantees of the Bill of Rights and the Fourteenth Amendment and their relation to a liberal democratic society.
- POL 1364 Business and Government Relations** 4 QH
Surveys the relation between economic developments and political processes in the United States. Considers government planning of the economy, monopoly and government regulation, government programs to promote social welfare, and the impact of Federalism on the political-economic system, among other topics.
- POL 1368 Government and Politics of Latin America** 4 QH
Examines the governmental systems, political parties, socio-economic problems, and foreign policies of Latin American states. Focuses on political change. (IV)
- POL 1369 Political Violence** 4 QH
Analyzes political violence in its various contemporary forms (for example, revolution, genocide, political terrorism, military overthrows). Assesses the causes and consequences of political violence (from both practical and moral points of view) and considers strategies for preventing and resolving political violence.
- POL 1371 Government and Politics of China** 4 QH
Focuses on China's political system during Communist party rule. Addresses fundamental issues that the government has been unable to resolve successfully including leadership recruitment and succession; economic growth; class and class struggle; political culture and the educational system; the nature of socialist democracy and socialist legality; and the appropriate form of socialism for a country wishing to modernize rapidly. Examines the interaction among ideology, development, and culture on these issues. (IV) *Prereq.* Sophomore standing or above.
- POL 1373 Pre-Modern Political Thought** 4 QH
Presents an analytical and historical examination of the great political thinkers and the main trends of political thought from classical Greece to the Renaissance. (V) *Prereq.* Junior standing or permission of instructor.
- POL 1374 Modern Political Thought** 4 QH
Presents an analytical and historical examination of the great political thinkers and the main trends in political thought from the Renaissance to the twentieth century. (V) *Prereq.* Sophomore standing or above.
- POL 1378 Contemporary Political Thought** 4 QH
Analyzes current ideals, ideologies, and political movements, including existentialism, neo-Marxism, black power, and women's liberation. Also studies the decline of ideology and behavioralism.
- POL 1379 Marx and Marxism** 4 QH
Studies the social and political thought of Karl Marx. Examines the development of Marxian theory after Marx's death. Discusses class struggle, social revolution, and communism. (V)
- POL 1382 Intergovernmental Relations** 4 QH
Analyzes the relationships among national, state, and local levels of government in the United States and the changing patterns of those relationships.
- POL 1384 Arab-Israeli Conflict** 4 QH
Analyzes the effects of the Arab-Israeli confrontation on the internal politics of the Arab states and Israel, Pan-Arab politics, and the role of the great powers in the region. (VI)
- POL 1386 International Law** 4 QH
Focuses on territory and jurisdiction of states, treaties, recognition, peaceful settlement of disputes, resort to force. *Prereq.* POL 1112.
- POL 1388 Political Polling and Survey Research** 4 QH
Examines the entire survey research process, which is the most common approach to program evaluation survey design, sampling, questionnaire design, survey administration, data processing, and data analysis. Also involves some statistical analysis. *Prereq.* POL 1301.

POL 1389 American National Security Policy 4 QH

Traces the evolution of American national security policy in the post-World War II period. Considers American nuclear military policy and conventional non-nuclear military policy. Explores arms control policy.

POL 1410 Seminar in American Government 4 QH

Offers an in-depth study of selected topics in American government. *Prereq.* Senior political science major and permission of instructor.

POL 1411 Seminar in International Relations 4 QH

Offers an in-depth study of selected topics in international relations. *Prereq.* Senior political science major and permission of instructor.

POL 1413 Senior Seminar in Political Science 4 QH

Offers an in-depth study of selected topics in political science. *Prereq.* Senior political science major.

POL 1415 Seminar in Public Law and Social Issues 4 QH

Explores the various attempts to give law a satisfactory philosophical foundation and the major critiques of the role of law in modern society. Places special emphasis on the attempt by courts to render justice in various areas of law. The central issue is whether law is a source of objective and determinate, rather than merely personal or political, answers to contentious legal questions. *Prereq.* Junior or senior standing.

POL 1710 Introduction to Politics (Honors) 4 QH

Honors equivalent of POL 1110.

POL 1711 Introduction to American Government (Honors) 4 QH

Honors equivalent of POL 1111.

POL 1712 Introduction to International Relations (Honors) 4 QH

Honors equivalent of POL 1112.

POL 1800, POL 1801, POL 1802 Directed Study 4 QH each

Offers independent work on chosen topics under the direction of members of the department. *Prereq.* Junior or senior standing and permission of instructor.

POL 1803 Internship in Politics 4 QH

With department approval, students engage in a political or governmental internship under the supervision of a faculty member. *Prereq.* Junior or senior standing normally required.

POL 1804 Practicum in Lobbying 4 QH

Offers fieldwork opportunity for students to become involved in supervised lobbying activity on the national or state levels of politics. (May be taken only once for academic credit.) *Prereq.* Middler, junior, or senior standing.

POL 1805 Internship in American Government and Politics 4 QH

Students engage in an internship in the Federal government with department approval, under the supervision of a faculty member. *Prereq.* Junior or senior standing usually required.

POL 1815 Internship in State Government 6 QH

Combines state government work experience with academic studies. Students work 15 hours per week in a state government office and attend classes every other week in which work experience and related readings are discussed. *Prereq.* POL 1111 or POL 1318.

Psychology**PSY 1110 Perspectives in Psychology I** 4 QH

Surveys the fundamental principles and issues of the major areas of contemporary scientific psychology. Approaches the study of psychology as a method of inquiry as well as a body of knowledge. Emphasizes biological bases of behavior, principles of learning and motivation, psychological testing, personality dynamics, psychopathology, and therapeutic approaches. *Students who earn credit for PSY 1111 will not earn credit for PSY 1110. (II)*

PSY 1111 Foundations of Psychology I 4 QH

Surveys the fundamental principles and issues of the major areas of contemporary scientific psychology. Approaches the study of psychology as a method of inquiry as well as a body of knowledge. Emphasizes biological bases of behavior, principles of learning and motivation, psychological testing, personality dynamics, psychopathology, and therapeutic approaches. Requires research participation in psychology experiments (or alternative). *Students who earn credit for PSY 1110 will not earn credit for PSY 1111.*

PSY 1112 Foundations of Psychology 2 4 QH

Continues PSY 1111, emphasizing the areas of lifespan development, sensory and perceptual processes, states of consciousness, cognition, language, memory, emotion, and social influences on behavior. Requires research participation in psychology experiments (or alternative). (Overlaps PSY 1113.) *Prereq.* PSY 1110 or PSY 1111.

PSY 1113 Perspectives in Psychology 2 4 QH

Continues PSY 1110, emphasizing the areas of lifespan development, sensory and perceptual processes, states of consciousness, cognition, language, memory, emotion, and social influences on behavior. (Overlaps PSY 1112.) (II) *Prereq.* PSY 1110 or PSY 1111.

PSY 1210 Research Methods in Psychology 4 QH

Introduces research methods in psychology such as field research, content analysis, case research, survey methods, simulations, and laboratory experiments. Examines issues of research fairness and evaluating research methods. Explores basic statistical notions including sampling, variability, and correlation. *Prereq.* PSY 1112 or PSY 1113.

PSY 1211 Statistics in Behavioral Science I 4 QH

Introduces descriptive statistics (scales of measurement, frequency distribution and graphs, measures of central tendency, dispersion and correlation, standard scores, and the unit normal curve) and probability theory (permutations, combinations, and the binomial theorem). *Prereq.* MTH 1101 or MTH 1107.

PSY 1212 Statistics in Behavioral Science 2 4 QH

Offers a general presentation of hypothesis testing, including parametric and nonparametric tests, with emphasis on formulating hypotheses and choosing appropriate scales of measurement, tests, and confidence levels. *Prereq.* PSY 1211.

PSY 1215 Sexual Behavior 4 QH

Focuses on the sexual activities of the human male and female from infancy to adulthood. Considers the importance of sexual factors in the life history of the individual, statistical surveys of sexual behavior, and direct observational measures of sexual responding. Explores the nature of love, responses to pornography, prostitution, bisexuality, male and female homosexuality, rape, child abuse, and sexual therapy.

PSY 1216 Researching Consciousness**4 QH**

Introduces the varied scientific approaches to the study of consciousness and the diverse theories of consciousness and the mind. Explores biology and consciousness; drug-induced states of consciousness, dreaming; hypnosis, meditative states, pain perceptions, animal minds, and anomalous psychology (e.g., near-death experiences and ESP). Examines data, theory, and methodological and conceptual problems.

PSY 1218 Psychology of Women**4 QH**

Introduces the student with little or no background in psychology to the current theories and research on the psychology of women. Critically examines psychological, biological, and social influences on gender differences, gender roles, and gender stereotypes in the light of scientific evidence and individual experience. Assesses their consequences for society. Uses the unique perspective generated in the field of the psychology of women to evaluate traditional research methods in psychology as well as the major psychological theories formulated to explain women and the differences between women and men. Emphasizes critical-thinking skills.

PSY 1220 Biological Basis of Mental Illness**4 QH**

Examines current hypotheses of brain dysfunction involved in mental illness. Explores the field of biological psychiatry including events in the brain that can be linked to mental disorder. Studies current neurochemical and genetic theories of diseases such as schizophrenia and depression. Emphasizes recent research and critically assesses treating mental disorders biologically, such as with drug therapy.

PSY 1231 Learning and Motivation I**4 QH**

Offers an introduction to the basic learning and motivational principles that permit humans and animals to adapt effectively to a changing environment. Emphasizes research and theories of operant and Pavlovian conditioning, with discussions of discriminations and generalization, avoidance and punishment, acquired motivational states (for example, addiction), concept formation, biological constraints on learning and behavior, animal cognition, and other related topics. Relates learning and motivational principles to the understanding and treatment of behavioral, affective, cognitive, and motivational disorders. *Prereq.* PSY 1112 or PSY 1113.

PSY 1241 Developmental Psychology**4 QH**

Examines changes in social relationships, moral reasoning, language, cognition, sensation and perception, personality, and sex roles that occur with development from infancy through adolescence. Examines major theories of development regarding the role of biology, social learning, and peer and parental influences. Explores individual differences (in attachment and temperament, for example) and research issues relevant to the study of children. *Prereq.* PSY 1112 or PSY 1113.

PSY 1242 Adult Development and Aging**4 QH**

Examines theories of adult personality development and views on the stability of personality over time. Explores changes from young adulthood onward in sexuality, heterosexual relationships, friendships, and occupational roles as well as age-related differences in learning, memory, intelligence, and physical functioning. Attention is also given to issues surrounding family violence, age-related changes in mental health and suicide rates, death and dying, ageism, and intergenerational relations. *Prereq.* PSY 1112 or PSY 1113.

PSY 1243 Infant Development**4 QH**

Focuses on the fact that during the first two years of life, the basic physical perceptual, cognitive and emotional capacities emerge and interact in the development of such complex behaviors as visually guided movement, the formation of social attachments, and the emergence of language. Provides an introduction to this critical period of human development; emphasizes how the infant's biological inheritance interacts with the physical and social environment in the generation of these important abilities and behaviors. *Prereq.* PSY 1241 or ED 1102.

PSY 1244 Childhood Mental Illness and Mental Retardation**4 QH**

Focuses on mental illnesses that are first diagnosed in childhood such as autism, phobias, conduct disorders, and attention-deficit disorder. Overviews childhood depression and suicide and disorders of eating and sleeping. Covers etiological factors in mental retardation (e.g., maternal disease, lead poisoning, chromosome abnormalities). Describes personality characteristics of individuals with mental retardation as well as the effects of institutionalization, mainstreaming, and psychological interventions. *Prereq.* PSY 1112.

PSY 1251 Food, Behavior, and Eating Disorders**4 QH**

Investigates what starts and stops eating behavior. Examines taste, nutrition, metabolism, the brain, food experiences, and societal factors that control feeding behavior. Emphasizes the biological/psychological interaction in normal eating and in pathological eating, such as anorexia, bulimia, and extreme obesity.

PSY 1262 Psychology of Language**4 QH**

Provides a basic introduction to psycholinguistics. Topics include the nature and structure of languages, processes involved in the production and comprehension of language, the biological bases of language, and aspects of language acquisition. Examines current theories of language processing and related experimental findings. *Prereq.* PSY 1112 or PSY 1113.

PSY 1263 Nonverbal Communication**4 QH**

Examines the messages we send by posture, facial expression, gesture, gait, and interpersonal distance. Also explores how power, status, and gender affect nonverbal communication. *Prereq.* PSY 1112 or PSY 1113.

PSY 1271 Social Psychology**4 QH**

Provides an introductory survey of social psychology. Focuses on aggression, attribution, attitude formation, change, measurement, conformity, impression formation, and group processes (social facilitation, deindividuation, for example). *Prereq.* PSY 1112, PSY 1113, or permission of instructor.

PSY 1272 Personality I**4 QH**

Offers a systematic study of the normal personality and its development. Focuses on behavioral, dynamic, and constitutional determinants, assessment of personality, research; surveys the major theories of personality. *Prereq.* PSY 1112 or PSY 1113.

PSY 1273 Personality 2**4 QH**

Continues PSY 1272. *Prereq.* PSY 1272.

PSY 1274 Psychology and the Law**4 QH**

Traces the effects of psychological factors through the course of a trial, including such issues as accuracy of eyewitness identification, plea bargaining, jury selection, persuasion tactics in the

courtroom, presumption of innocence, jury size, jury decision rules, and sentencing and punishment.

PSY 1280 Black Psychological Identity

4 QH

Provides an interdisciplinary look at the social, political, and psychological factors shaping contemporary African-American identity. Explores several different factors that interact with blackness to shape the diversity of African-American experience, such as skin color, gender, culture, and class. Studies black identity as it has been conceptualized, measured, and researched by psychologists. Readings include essays written by important African-American thinkers, fiction and autobiographical narratives, as well as empirical research in the field of psychology. This course is the same as AFR 1280.

PSY 1351 Psychobiology

4 QH

Focuses on the relation between brain function and human behavior. Examines how nerve cells function individually and work together both in small networks and in the nervous system; the structure of the nervous system; how our sense organs provide the nervous system with information about the outside world; how the brain controls movement; and how psychological concepts from motivation to language and memory are represented in the brain. *Prereq.* PSY 1112, PSY 1113, or permission of instructor.

PSY 1353 Animal Behavior

4 QH

Surveys animal behavior in a wide range of species (reptiles, birds, fish, and mammals, including humans) to find similarities and differences in the behavioral processes and physiological mechanisms by which individual organisms and species adapt to their environments. The first section focuses on adaptive specializations exhibited by animals in learning about their environments during early development and as adults. The second section examines problems of social organizations at the individual level: how animals communicate with each other and transmit "cultural" skills; mechanisms underlying cohesion and dispersal (for example, reproduction and aggression); and the adaptive advantages of being social or asocial. The final section provides students with an unusual opportunity to apply concepts and experimental methods they have learned by actually doing a short field study of animal behavior at the Boston Zoological Park. *Prereq.* PSY 1112, PSY 1113, or permission of instructor.

PSY 1362 Child Language

4 QH

Examines how language develops in children. *Prereq.* PSY 1262, linguistics, or permission of instructor.

PSY 1364 Cognition

4 QH

Provides a basic introduction to human cognition. Topics include pattern recognition, attention, memory, categorization and concept formation, problem solving, and aspects of cognitive development. Examines current theories of cognitive processing and related experimental findings. *Prereq.* PSY 1112 or PSY 1113.

PSY 1365 Language and the Brain

4 QH

Focuses on linguistic behavior from a neuro-psychological viewpoint. Examines models of how the nervous system, and the brain in particular, controls the production, perception, and internal manipulation of language. Considers localization of cerebral functions and hemispheric lateralization; experimental and clinical evidence for functional models; aphasia and other language pathologies; schizophrenic language; evidence from "slips of the tongue"; and the bilingual brain. Compares speech, sign language,

and writing systems. Also discusses interpretation and translation. *Prereq.* PSY 1262 or permission of instructor.

PSY 1371 Industrial/Organizational Psychology

4 QH

Surveys the psychological fundamentals underlying performance in work settings. Topics include psychological testing, performance evaluation, training, motivating, and leading employees, and the social psychology of organizations. Emphasizes ethical and affirmative action issues. *Prereq.* PSY 1271 and PSY 1211.

PSY 1373 Abnormal Psychology 1

4 QH

Surveys the abnormal personality, including systems of diagnoses, defense mechanisms, and criteria of psychopathology. Examines the symptomatology, etiology, and dynamics of anxiety disorders (phobia, obsessions, compulsions, etc.), dissociative disorders (amnesia, multiple personality, etc.), and somatoform disorders. Examines case histories in detail. *Prereq.* PSY 1112 or PSY 1113.

PSY 1374 Abnormal Psychology 2

4 QH

Surveys psychological and somatic therapies. Examines the symptomatology, etiology, dynamics, and therapy of schizophrenia, paranoid disorders, mania, depression, and organic disorders. *Prereq.* PSY 1373.

PSY 1381 Sensation

4 QH

Provides an introduction to the study of our senses, with emphasis on hearing, touch, taste, and smell. Focuses on how we measure our sensory abilities and relates findings to the functioning of sensory organs—ears, skin, mouth, and nose—and of the sensory nervous system. *Prereq.* PSY 1112 or PSY 1113; PSY 1351 is highly recommended.

PSY 1382 Perception

4 QH

Offers a study of our awareness of the world around us, exemplified primarily by visual perception. Covers light, visual sensory mechanisms, color vision, illusions, consciousness, and dreams. *Prereq.* PSY 1112 or PSY 1113; PSY 1351 is highly recommended.

PSY 1410 Systems and Theories of Psychology

4 QH

Presents in an historical context the core ideas and theoretical positions encountered by students in previous courses. Examines different systematic orientations such as structuralist, functionalist, Gestalt, psychoanalytic, behaviorist, cognitive, and humanistic psychology to demonstrate the extent to which the systems influence contemporary American psychology. *Prereq.* Junior or senior status in psychology major or permission of instructor.

PSY 1431 Behavior Therapies

4 QH

Offers a study of successful projects that have provided effective remediation and rehabilitation in institutions for the mentally ill, the mentally retarded, and the developing human (schools). *Prereq.* PSY 1231 or permission of instructor.

PSY 1442 Human Memory

4 QH

Offers a detailed examination of how people learn and remember. Examines the different kinds of memory, short-term, episodic, and semantic, with emphasis on current theories of memory function and related experimental findings. *Prereq.* PSY 1364 or PSY 1262.

PSY 1451 Psychopharmacology

4 QH

Examines interactions between drugs, brain, and behavior. Focuses on such topics as synaptic transmission, behavioral functions of specific neurotransmitter systems, pharmacological treatment of

mental and neurological disorders, and drug abuse. *Prereq.* PSY 1351 or equiv. with permission of instructor.

PSY 1499 Psychology of Reading 4 QH

Provides an overview of issues in the psychology of reading. Topics include the nature of the reading process as a cognitive activity, eye movement patterns in reading, stages of reading development, and dyslexia. Examines current theories of reading and text comprehension. *Prereq.* PSY 1262 or PSY 1364.

Directed Studies — Honors Courses

PSY 1710 Perspectives in Psychology 1 (Honors) 4 QH

Honors equivalent of PSY 1110. (II)

PSY 1713 Perspectives in Psychology 2 (Honors) 4 QH

Honors equivalent of PSY 1113.

PSY 1770 Honors Directed Study 4 QH

For details contact the undergraduate coordinator in the psychology department, 125 Nightingale Hall.

PSY 1890, PSY 1891, PSY 1892, PSY 1893, PSY 1894 Directed Study 4 QH each

Offers independent work under the direction of the psychology department, usually in a research project in one of the department labs. Faculty members normally require completion of advanced lab courses in the area of research interest, but this is a matter of individual discussion. Students interested in directed study should consult a departmental adviser. *Prereq.* Permission of instructor.

PSY 1895, PSY 1896, PSY 1897, PSY 1898 4 QH each

Junior/Senior Honors Program

For details contact the honors office.

Laboratories

PSY 1511 Experimental Design in Psychology 4 QH

Focuses on the experimental method in the design, execution, analysis, and reporting of psychological investigations of humans and animals. *Prereq.* PSY 1112 or PSY 1113 and PSY 1212.

PSY 1530 Experiments in Learning and Motivation 4 QH

Gives students the opportunity to assess the generality, specificity, and robustness of learning and motivational principles primarily through field experiments with free-ranging feral animals. Involves designing and conducting experiments and writing reports on operant and Pavlovian conditioning, adjunctive behavior, biofeedback, and related topics. Focuses on the theoretical and clinical implications of experimental findings. This course does not use laboratory animals. *Prereq.* PSY 1231 and PSY 1211.

PSY 1531 Learning and Motivation Laboratory 4 QH

Gives students the opportunity to gain proficiency, through direct experience, in lab analysis of behavior and in evaluating common generalizations about human behavior. Expects students to design and perform experiments in animal and human learning, memory, decision processes, concept formation, and other topics of individual interest. *Prereq.* PSY 1212 and PSY 1231.

PSY 1551 Laboratory in Psychobiology 4 QH

Introduces the methods of research in psychobiology. Expects students to work in small groups, conducting three to four hands-on laboratory exercises under supervised conditions.

Expects students to read selections of the relevant scientific literature, analyze the collected data, and write experimental reports. *Prereq.* PSY 1351 or permission of instructor.

PSY 1562 Psycholinguistics Laboratory 4 QH

Provides students the opportunity to acquire first-hand experience in conducting research on issues in the psychology of language. Focuses on classical experiments and their implications for broader issues of language processing. Involves students in all aspects of each experiment, including collecting and analyzing data and preparing lab reports. *Prereq.* PSY 1212 and PSY 1261 or PSY 1364.

PSY 1564 Cognition Laboratory 4 QH

Provides students the opportunity to acquire first-hand experience in conducting research on issues in human cognition. Focuses on classical experiments and their implications for broader issues of cognitive functioning. Involves students in all aspects of each experiment, including collecting and analyzing data and preparing lab reports. *Prereq.* PSY 1212 and PSY 1364 or PSY 1262.

PSY 1571 Laboratory in Social Psychology 4 QH

Provides an introduction to the methods of social-psychological research. Assists students in developing the ability to read published social research with a critical eye, to pose questions in a testable manner, to apply experimental methods to social research, and to express themselves in APA journal style. *Prereq.* PSY 1212 and PSY 1271.

PSY 1572 Personality Laboratory 4 QH

Provides an introduction to the methods and areas of personality research. Discusses problems of measurement, control, and interpretation. Critically examines representative published experiments. Expects students to design, collect data for, assess, and write up several experiments, including one original research project. *Prereq.* PSY 1212 and PSY 1272.

PSY 1581 Sensation and Perception Laboratory 4 QH

Focuses on experiments involving precise measurements of both physical and psychophysical phenomena, including auditory function, color vision and after-effects, muscular sensation, tactile sensitivity, and adaptation to perceptual distortions. *Prereq.* PSY 1212 and PSY 1381 or PSY 1382.

Seminars

PSY 1610 Psychological Research and Personal Values 4 QH

Examines ethical concerns and values in designing and applying research, in setting research goals, and in using research subjects. Develops strategies for reflecting on ethical concerns from historical, psychological, philosophical, sociological, and spiritual perspectives, and for putting personal values into action through innovation, advocacy, career decisions, etc. *Prereq.* Any laboratory course in psychology and research or co-op experience in psychology.

PSY 1614 Seminar on Heredity and Society 4 QH

Focuses on the origins of the intelligence testing movement and the movement's relation to eugenics and to behavior genetics. Studies history, methods, substantive findings, and social implications of psychological measurement and testing. Examines the extensive research literature on intelligence testing and the nature/nurture problem in areas such as psychopathology, criminality, and alcoholism. *Prereq.* Permission of instructor.

- PSY 1632 Seminar in Behavior Modification** 4 QH
Discusses topics in behavior modification in a seminar format. *Prereq.* PSY 1231, PSY 1531, or permission of instructor.
- PSY 1651 Seminar in Psychobiology** 4 QH
Offers intensive study, discussion, and practice in lab studies of physiological variables. Covers evolution of the nervous system, sensory and motor mechanisms, motivation and emotion, sleep, attention and perception, learning, and memory. *Prereq.* PSY 1351 or permission of instructor.
- PSY 1661 Seminar in Psycholinguistics** 4 QH
Offers intensive study and discussion of issues in the psychology of language. Specific topics vary by quarter. *Prereq.* PSY 1212 and PSY 1262 or PSY 1364.
- PSY 1662 Seminar in Cognition** 4 QH
Offers intensive study and discussion of issues in cognitive psychology. Specific topics vary by quarter. *Prereq.* PSY 1212 and PSY 1262 or PSY 1364.
- PSY 1671 Seminar in Social Psychology** 4 QH
Expects students to examine and present in class their findings on a particular topic in social psychology, such as attribution, aggression, conformity, attitude-behavior relationship. *Prereq.* PSY 1271 or permission of instructor.
- PSY 1672 Seminar in Clinical Psychology and Personality** 4 QH
Offers seminar presentations of topics relevant to understanding the normal and disturbed personality. Covers topics such as specialized assessment procedures, cognitive styles in personality, temperament, hypnosis, anxiety, aggression, specialized clinical syndromes, and the development of conscience. *Prereq.* PSY 1373 or permission of instructor.
- PSY 1681 Seminar in Sensation and Perception** 4 QH
Expects students to present in class their finding on topics such as how perceptions are organized, formed, and modified by sensory, attentional, motivational, and cognitive factors, how our sensory systems extract information from the environment in a consistent and lawful manner, despite large changes in environmental conditions, and how to account for this in physiological terms. *Prereq.* PSY 1351 and PSY 1381 or PSY 1382.

Sociology

- SOC 1100 Introduction to Sociology** 4 QH
Explores basic concepts and theories concerning the relation between individuals and society. Emphasizes the influence of culture, social structure, and institutions in explaining human activity. Discusses and analyzes social groups, socialization, community, class, power, and social change, among other substantive issues.
- SOC 1101 The Sociology of Everyday Life** 4 QH
Examines the development, application, and consequences of rules for everyday activities (for example, walking, talking, eating, drinking, sitting, smoking, laughing, crying, and sleeping). Considers the effects of artifacts, culture, space, and territory on these activities, on social life, and on the expression of emotions.
- SOC 1102 Social Inequality and Communication** 4 QH
Analyzes the ways in which groups and institutions, in both their ritual and everyday activities, communicate the idea of hierarchy and an individual's place in it through face-to-face interaction, formal communication, and the use of space and time. Takes a dramaturgical approach to social organization, with special emphasis on status images in the media and the communication of social place by service organizations and professional groups. Includes some content analysis and observational fieldwork.
- SOC 1103 American Society** 4 QH
Focuses on American society, culture, and major social institutions: economic, religious, governmental, familial, educational, welfare, and recreational. Examines social classes and stratification, mobility, and individualism. *Prereq.* SOC 1100 or equiv.
- SOC 1104 Contemporary Japanese Culture and Society** 4 QH
Focuses on contemporary Japanese urban society. Examines major values, family structure, sex roles, social control, the economy and the division of labor, mass media, religion, arts, and social problems. (IV)
- SOC 1105 Society and Culture in Russia and the Former Soviet Union** 4 QH
Focuses on contemporary Russian society. Emphasizes the social, economic, and political reforms of the Gorbachev period and the ways in which the Soviet Union has evolved since 1917 and in the post-Soviet period. (IV)
- SOC 1120 Sociology of Boston** 4 QH
Examines Boston from the perspectives of environmental development, neighborhood and intergroup relations, institutional services, and symbolic meanings. Explores current issues in the city through term projects. Requires field trips.
- SOC 1121 Doing Sociology** 4 QH
Takes a research approach to sociology. Focuses on students' participation in their own learning about sociology as a body of knowledge and as a method of studying social life. Requires students to use the computer during the course. (II)
- SOC 1125 Social Problems** 4 QH
Analyzes in both empirical and theoretical terms many of the social problems currently facing Americans. Focuses on the deepening inequality and poverty among working and middle-class Americans, particularly racial minorities, women, and youth; related problems of racism and sexism; the disintegration of the family; growing unemployment; the international ecological crisis; the deterioration of the health system; crime; war and militarism; and strategies and political options for solving these problems.
- SOC 1135 Social Psychology** 4 QH
Examines the effects of social interaction on individual behavior. Surveys major theoretical orientations and substantive topics such as presentation of self, effect of television, conformity in fads, gossip and rumor, mass and serial murder, and bystander apathy.
- SOC 1140 Sociology of Prejudice and Violence** 4 QH
Examines factors in the development and maintenance of prejudice and discrimination. Discusses American race relations, anti-Semitism, sex roles, and stereotyping.
- SOC 1146 Environment and Society** 4 QH
Examines the political economy of the global environmental crisis. Topics vary from quarter to quarter and include such issues as world resource availability, energy, pollution, ecological degradation in the Third World, environmental policy, and social movements. Involves practical experience in environmental problem solving. (VI)

- SOC 1147 Urban Social Problems** 4 QH
Focuses on the foundations of urban life in historical perspective. Analyzes relation of city life to environment, population, social organization, technology and cultural values. Examines growth trends, urbanization, urban planning, and citizen action.
- SOC 1150 Introduction to Women's Studies: Image, Myth, and Reality** 4 QH
See INT 1150 for course description.
- SOC 1155 Sociology of the Family** 4 QH
Focuses on the family as a social institution in several selected cultures; interrelations of the family and political, economic, and educational institutions; social nature of personality; role taking; individualism, mobility, and industrialism. (V)
- SOC 1156 Violence in the Family** 4 QH
Examines physical, emotional, and sexual violence in families, with emphasis on child, sexual, and spouse abuse. Covers definitions, prevalence, causes, prevention, and treatment of specific cases of domestic violence. Focuses on social policy issues and problems of legal intervention in cultural and family issues.
- SOC 1160 Gender in a Changing Society** 4 QH
Considers why and how gender is constructed in American society, and looks at different theories of gender. Includes topics such as the expression of gender in everyday life; its development in childhood; its centrality in the traditional family, the workplace, and sexuality; and its role in violence against women.
- SOC 1165 Students, Schools, and Society** 4 QH
Emphasizes the role of education in processes of socialization, social mobility, social control, and social change. Do social characteristics (sex, race, class, age, physical status) influence the school experience? Do schools provide opportunity and initiate change, or do they perpetuate the status quo in economic, political, and social life? Who goes to school, where, for how long, and with what result? How does educational advantage get translated into jobs and social status? Encourages students to draw on their own experiences to develop paper topics.
- SOC 1168 The Social Movements of the 1960s** 4 QH
Considers the social and cultural movements of the 1960s and their origins in the Civil Rights movement. Examines the opposition to government policies and social norms that developed into the Civil Rights, student, New Left, antiwar, countercultural, and women's movements in order to understand their grievances, goals, composition, and impact.
- SOC 1170 Race and Ethnic Relations** 4 QH
Focuses on racial and religious groups, particularly with reference to the United States. Places special emphasis on historical development, specific problems of adjustment and assimilation, and specific present-day problems and trends. *Prereq.* SOC 1100 or *equiv.*
- SOC 1171 Race and Ethnic Relations: A World Perspective** 4 QH
Offers a cross-cultural analysis of race and ethnic relations in Western and non-Western societies. Examines race and ethnic relations in terms of contemporary developments, world problems, and ideological conflicts.
- SOC 1175 Sociology of Work** 4 QH
Analyzes dramatic changes occurring in the work lives of Americans and considers the future of American workers within the global economy. Explores emerging labor markets, gender, race, and technology in shaping contemporary American work settings. (VI)
- SOC 1176 Sociology of Business/Industry** 4 QH
Focuses on the role of industry in modern society. Examines similarities and dissimilarities among industrial societies, bureaucracy and its alternatives, unions, supervision democracy and manipulation, the worker on the assembly line, sabotage of the organization, and the role of wages and alienation.
- SOC 1177 Social Roles in the Business World** 4 QH
Analyzes the social structure of corporate and business life in contemporary America. Presents and discusses case studies from major accounting and/or industrial firms. Examines the "career line" in the world of business and management, with a special focus on age/sex, racial/ethnic, and class/income barriers.
- SOC 1178 Women Working** 4 QH
Discusses the fact that differences in the labor force experience of men and women workers generally go unrecognized, and the work experience most common to women—household work—is rarely analyzed. Covers women's market and nonmarket activities, their rewards, and their problems, in addition to empirical and theoretical analyses of the work roles of women. Overall, underscores the differences between work experiences of men and women.
- SOC 1180 Sociology of Consumerism and Consumer Behavior** 4 QH
Provides students with an opportunity to explore a relevant consumer issue.
- SOC 1185 Deviant Behavior and Social Control** 4 QH
Explores the conditions under which people categorize others as deviant; processes by which persons so defined are assigned deviant status and assume appropriate roles and self-images; development of deviant careers and their relation to deviant subcultures; situations in which people transform deviant identity.
- SOC 1190 Juvenile Delinquency** 4 QH
Examines the sociological and psychological approaches to and their implications for a typology of delinquency. Discusses problems of prevention, treatment, and rehabilitation.
- SOC 1195 Drugs and Society** 4 QH
Offers an introduction to the sociology of drugs. First examines social definitions of drugs, conditions of their use, and socialization into drug use. Then considers deviant drug use and effects of social control on definitions and use. Considers a range of licit and illicit drugs, but gives major emphasis to alcohol, marijuana, and heroin.
- SOC 1200 Sociology of Alcoholism** 4 QH
Focuses on social responses to deviant alcohol use. Examines drinking cultures and drinking practices in the United States; processes by which people are labeled "alcoholics"; and the role of agencies of social control, such as the criminal justice system and the health care system, in labeling and in rehabilitation.
- SOC 1201 Alcohol Use and Social Control** 4 QH
Examines how societies define and enforce rules on alcohol use, including the conditions under which controls, informal and formal, come into being, and the consequences of these controls. Examines case studies of Prohibition, liquor control, public

drunkenness, alcoholism, legal drinking age, drinking and driving, and drinking in college.

SOC 1202 Sociology of Drinking 4 QH
Examines how different groups and societies organize drinking as a social act and the consequences of that organization. Singles out for particular attention the cultural meaning assigned to drinking, the social elements found in all drinking situations, how members of social groups learn how to drink, and the social and psychological functions of drinking.

SOC 1205 Law, Crime, and Social Justice 4 QH
Analyzes the impact of the legal system on the creation and perpetuation of criminality in contemporary American society. Devotes particular attention to the study of the creation of criminal law, the judicial process, and the role of law in the gap between crime and social justice. Suitable for students in prelaw, criminal justice, political science, and allied fields.

SOC 1206 Class, Crime, and the Police 4 QH
Summarizes the major psychological, social, biological, economic, and political theories about the cause of crime. Applies these theories to the daily operations of the police, courts, and prison system in the United States. Examines white collar crime and the class bias inherent in the more lenient treatment of elite criminals.

SOC 1215 Sociology of Health 4 QH
Examines health and illness in the socio-political context. Focuses on the health professions, the health system, issues of cost, and availability of care. Compares the United States system with those of Western Europe, Eastern Europe, and the Third World. *Prereq.* SOC 1100 or permission of instructor.

SOC 1217 Women, Health, and Social Change 4 QH
Examines how women have traditionally been viewed by the medical field and how reproduction and childbirth came to be defined as medical problems. Also examines the implications for women in the changes that have taken place in health care, especially as these pertain to new reproductive frontiers and alternative health care facilities. Discusses the role of women in the health care professions.

SOC 1225 Aging and Society 4 QH
Surveys issues and questions on aging, with special attention to social and economic consequences of the aging process, including retirement and productivity, health care problems, nursing home residences, widower- and widowhood, and the approach of death. Presents examples relating to aging in other cultures in a search for new answers to social problems of aging in the United States. Gives students the opportunity to learn to anticipate, cope with, and even prevent problems of aging that concern self, family, and clients/patients.

SOC 1235 Death and Dying 4 QH
Focuses on the treatment of death and dying, including problems faced by health care professionals, family members, institutions, the funeral industry, and the dying themselves. Discusses cross-cultural perspectives, the social distribution of mortality, the changing nature of death, and the ethical problems in determining life and death with particular attention to such issues as abortion, suicide, and ceasing medical intervention. *Prereq.* SOC 1100 or permission of instructor.

SOC 1240 Sociology of Human Service Organizations 4 QH
Introduces selected theoretical perspectives on human service organizations, emphasizing defining organizational goals and effectiveness. Gives students the opportunity to become familiar with the nature of human service organizations; to compare these organizations to business and industrial organizations; to outline specific problems that human service organizations face; and to propose potential solutions.

SOC 1245 Sociology of Poverty 4 QH
Analyzes American poverty in historical perspective, drawing on comparisons with other countries. Critically evaluates of sociological research and theories relating to poverty. Considers causes and effects of poverty, as well as societal responses to poverty and its consequences. Suitable for students in applied fields, such as nursing, criminal justice, education, allied health, pre-med, and pre-law.

SOC 1247 Food and Hunger 4 QH
Examines the social causes and consequences of hunger and alternative approaches to solving world hunger.

SOC 1250 The Sociology of Private and Public Assistance 4 QH
Helps students understand why public and private assistance in the United States takes the form it does. Examines the ideology behind the welfare system, the kinds of assumptions made about the poor, how other countries deal with the problem, the effects of poverty in the United States, and some explanations for its continuing existence.

SOC 1255 Sport in Society 4 QH
Analyzes the social origins and functions of leisure activities, with special emphasis on games and sports as forms of leisure. Gives considerable emphasis to cross-cultural and historical analysis, as well as to the relation between leisure activities and various social institutions—economy, polity, family, and religion. (See SOA 1255.)

SOC 1275 Sociology of the Arts 4 QH
Examines the relation between the social organization of society and the forms of art produced—the social role of the artist, how the arts are “manufactured” and distributed, the art consumer’s relation to art and the artist, social support for the arts. Deals with a variety of art forms, with emphasis on the performing arts.

SOC 1276 Sociology of Popular Culture 4 QH
Presents a sociological analysis of popular culture, focusing on the relationship between pop culture and social institutions such as religion, the law, education, the economy, and the family; the organizations and artistic communities that produce pop culture such as the music industry, theatrical groups, advertising agencies; and the social roles and socialization processes associated with individual artists. Examines changes in popular culture from the viewpoint of changes in the larger society.

SOC 1284 Technology and Careers of the Future 4 QH
Focuses on new technologies and their social impacts on work and careers in the future. Examines sociological and humanistic approaches to technical change in the shop floor, offices, and professions. Also covers issues of design and control, health, employment, and autonomy.

SOC 1285 Technology and Society 4 QH
Discusses the following questions: Does society control technology or is technology directing society? Has technology become

dehumanized? How valid is the doctrine of technological inevitability? Can the technological "fix" be viewed as a solution to social problems? Is technology itself a social problem? What can be expected of technology assessment? What of the back-to-nature and antitechnology movements today: are they the waves of the future? Expects students to do considerable independent study and research. (VI)

SOC 1286 Science and Society 4 QH

Examines the profound effects of science on our society, and the ways in which political, economic, and social forces have guided developments in science. Explores issues such as "responsibility" created by this interdependence. Emphasizes the social structures within which science operates and is communicated and science as an occupation and profession, as well as a system of thought and set of tools for producing knowledge. (VI)

SOC 1287 Society Tomorrow: Forecasting Alternative Futures 4 QH

Introduces students to the area of "social futures" or "future studies." Examines the major techniques used to forecast futures and the specific scenarios and projections about the social world of tomorrow. Considers the major prospects and problems for society in the future.

SOC 1290 Military and American Society in a Nuclear Age 4 QH

Investigates the relationship between the military and society. Covers selected issues, including the impact of the military on social institutions such as the family, polity, and economy, the arms race and upheaval in social life, the post-cold war legitimization crisis of the United States military, the role of women and minorities as reserve armies, and military spending and domestic social problems.

SOC 1300 Classical Social Thought 4 QH

Traces the development of sociology from the history of social thought. *Prereq.* Three sociology/anthropology courses.

SOC 1301 Current Social Thought 4 QH

Reviews the dominant theoretical traditions in contemporary sociology, particularly the pluralist, managerialist, Marxist (or class), and feminist paradigms. Emphasizes Parsonian functionalism; symbolic interactionism; power elite and conflict theory; and neo-Marxist theories of the state, family, economic crisis, imperialism, and global ecological crisis. *Prereq.* Three sociology or anthropology courses.

SOC 1302 Female Perspectives on Society 4 QH

Examines social science and interdisciplinary feminist literature that focuses on women in families and at work, and that deals with physical issues including violence against women and abortion. Incorporates the perspectives of women of color. Considers and evaluates women's views of social life as well as recognizes the differences among women. (VI)

SOC 1310 Class, Power, and Social Change 4 QH

Focuses on theories of social inequality as applied to the exercise of power and large-scale social change. Examines contemporary events in order to understand power structures. Required of majors. (V) *Prereq.* One sociology course and middler standing or permission of instructor.

SOC 1320 Introduction to Statistical Analysis 4 QH

Examines the application of the principles of measurement, probability, measures of centrality, tests of significance, and

techniques of association and correlation to social data. *Prereq.* SOC 1100 or permission of instructor.

SOC 1321 Research Methods 1 4 QH

Introduces students to the research process through an examination of the rules of evidence in empirical research and the place of values. Gives students the opportunity to learn how to design and critique types of sociological research, how to collect qualitative and quantitative data, and how to sample populations.

Prereq. SOC 1100 and SOC 1320, or permission of instructor.

SOC 1322 Research Methods 2 4 QH

Requires students to complete the research project begun in SOC 1321. Focuses on practice coding, building indexes, scaling, table construction; introduction to use of the computer. *Prereq.* SOC 1100, SOC 1320, and SOC 1321, or permission of instructor.

SOC 1324 Human Services Research and Evaluation 4 QH

Covers basic issues in applied research and the evaluation of services, including the purposes of evaluation, ethics, formulating questions and measuring answers, designing evaluations and planning oriented research, utilizing evaluation results, and the turbulent setting of action programs. Suitable for students majoring in human services, sociology, psychology, nursing, health education, and related fields. *Prereq.* SOC 1320 or other statistics, SOC 1240, or permission of instructor.

SOC 1335, SOC 1336 Group Behavior 1, 2 4 QH each

Explores how individuals interact in groups and how groups interact with each other. Focuses on the reflexive self, social aspects of language, situational learning, group perspectives, careers, institutions, and worlds.

SOC 1345 American Demographics 4 QH

Offers an applied research experience in which students have the opportunity to study the major areas of demography. Focuses on the resources of the United States Census Bureau and, in particular, the data products available from recent census surveys.

SOC 1347 Community Analysis 4 QH

Explores types of human settlements, focusing on the interaction between people and their political, economic, and social environments. Discusses power structure and citizen action to influence institutions; skills in community analysis, including use of documents, survey, observation, and evaluation of needs and resources; strategies of conflict, cooperation, and negotiation to attain community and group ends.

SOC 1348 Seminar in Urban Studies 4 QH

Compares interdisciplinary approaches to urban studies according to problem areas and research methods. Gives students the opportunity to extend previous term paper projects after exposure to social action and social systemic theoretical perspectives. *Prereq.* SOC 1147 or permission of instructor.

SOC 1350 Women in Jewish Culture 4 QH

Uses some of the tools of contemporary feminist theory and methodology to focus on questions about the resurgence of ethnic/religious identities in the United States and the meaning of this for contemporary Jewish women. Analyzes the changing relationship of women to Judaism by trying to recover Jewish women's experiences in America since the turn of the century by looking at some key institutions—work, family, religion, the feminist movement, the media, literature, and film.

SOC 1355 Politics and Economy in U.S. Society 4 QH
Examines the political economy of United States capitalism. Focuses on the impact of new forms of economic crisis on politics, social classes, labor, and the state.

SOC 1360 Social Class, Status, and Power 4 QH
Focuses on theories of social inequality, concepts of social class, aspects of status and role difference, and criteria for social mobility.

SOC 1365 Collective Behavior 4 QH
Focuses on the rise of new group forms in response to persistent social unrest; masses, crowds, and publics; specific instances of collective behavior such as race riots, wildcat strikes, prison revolts, and campus disorders.

SOC 1375 Sociology of Occupations and Professions 4 QH
Considers occupations and professions as institutions in a broader socio-political context. Includes a historical and international perspective on topics such as training, professional associations, professional services, and the relation of professional groups to capitalism and to states. *Prereq. Four sociology or anthropology courses or permission of instructor.*

SOC 1376 Organization and Bureaucracy 4 QH
Focuses on sociological study of organizations. Examines case studies of private corporations, federal bureaucracies, social service agencies, military-industrial complex, high-risk technological systems, unions. Analyzes recent theories of innovation, participation, and opportunity in complex organizations.

SOC 1385 Social Deviance 2 4 QH
Examines the leading theories of deviance (anomie, subcultural deviance, labeling) and their principal variants; studies their assumptions, conceptions, propositions, and supportive evidence; analyzes empirical studies in each theoretical tradition.

SOC 1470 Sociology of Religion 4 QH
Offers a comparative and analytic treatment of religion as a social institution, focusing on the relations between religious organizations and other social institutions, with particular emphasis on the American experience. Analyzes religion as an agent of social change and stability. *Prereq. SOC 1100.*

SOC 1475 The Sociology of Mass Communication 4 QH
Focuses on factors in the formation and development of public opinion, the effect of television on children, mass communication as social organization, media-depicted images of society, the role of personal influence, the process of rumor, the use of mass media by the poor, propaganda analysis, and the latent and manifest functions of mass communication.

SOC 1485 Computers and Society 4 QH
Examines the impact of the computer revolution on the conditions of work and life in contemporary society including legal and theoretical issues. Discusses ethical and professional issues in computer use. (VI) *Prereq. Junior in computer science or middler with ability to program.*

SOC 1500 Applied Sociology: Practice and Theory 4 QH
Analyzes the conditions under which sociological knowledge is applied to social problems, the kinds of problems, and the degree of effectiveness of this application. Pays particular attention to research and demonstration projects that derive from sociological theory.

SOC 1501 Social Policy and Social Intervention (Formerly Social Control 2) 4 QH
Focuses on study of the formation of social policies in response to social problems; analyzes policies and problems, supporters and opponents of policy change, conditions under which control agencies adopt new policies, and effects of policy change. Places particular emphasis on case studies of social action and legal change.

SOC 1525 Comparative Human Services 1 6 QH
Offers an intensive look at the American human services system. Gives upper-level undergraduate and graduate students the opportunity to study the origins, development, and present state of human services in the United States. Involves lectures as well as field visits in the Boston area. Provides independent study.

SOC 1526 Comparative Human Services 2 6 QH
Offers an intensive study of the British human services system. Provides students the opportunity to immerse themselves in the social and cultural context of British human services and involves field trips in London designed to examine firsthand the planning, administration, and delivery of human services in Great Britain.

SOC 1535 Seminar in Social Welfare 4 QH
Discusses problems in social welfare observed in the term between "Problems" and "Practicum." Requires a research paper, based on directed fieldwork in the intervening term.

SOC 1601 Seminar in Current Emphases in Sociology 4 QH
Reviews and discusses selected sociological topics. *Prereq. Junior or senior standing in sociology/anthropology or permission of instructor.*

SOC 1700 Introduction to Sociology (Honors) 4 QH
Honors equivalent of SOC 1100.

SOC 1710 Class, Power, and Social Change (Honors) 4 QH
Honors equivalent of SOC 1310. Any Honors Program member is eligible to enroll in this course.

SOC 1800, SOC 1801, SOC 1802, SOC 1803 Directed Study 4 QH each
Offers independent work on a chosen topic under the direction of members of the department. Limited to qualified students with approval of department chair. *Prereq. Junior or senior standing in sociology or permission of instructor.*

SOC 1821, SOC 1822, SOC 1823, SOC 1824 4 QH
Junior/Senior Honors Project
For details contact the honors office.

Theatre

THE 1100 Introduction to Theatre Arts 4 QH
Focuses on theatre in performance by examining the work of theatre artists (actors, designers, directors, and playwrights). Introduces students to the dynamics of performance and to the reading of play texts, and provides a brief overview of the development of Western theatre. (II)

THE 1106 Theatre History 1—Beginnings to Renaissance 4 QH
Explores the history of the theatre and its development in the West, focusing on Greece, Rome, Medieval Europe, Golden Age Spain, and Elizabethan and Stuart England. (Can be taken independently of THE 1107.)

- THE 1107 Theatre History 2—Renaissance to Naturalism** 4 QH
Focuses on the development of theatre in the Italian Renaissance; the spread of Italianate forms throughout Europe during the seventeenth and eighteenth centuries; the rise of Romanticism in Germany and its spread; and the rise of realism and naturalism in France, Scandinavia, and throughout Europe. (Can be taken independently of THE 1106.)
- THE 1111 American Musical Theatre** 4 QH
Traces the development of the American musical from *The Black Crook* to the present. Considers the role of musical theatre as both entertainment and serious art form through an examination of script, score, dance, and design. Includes works by composers and lyricists such as Rodgers and Hammerstein, Lerner and Loewe, Cole Porter, Bock and Harnick, Leonard Bernstein, and Stephen Sondheim.
- THE 1112 Dramatic Theory and Criticism** 4 QH
Examines and explores the major historical writings in dramatic and theatrical performance theory. Considers how dramatic theory is reflected in dramatic texts and production from Aristotle to the present.
- THE 1114 Masters of the Theatre** 4 QH
Overviews several great practitioners of theatre. In particular, stresses how society influenced the thought and craft of playwrights, actors, directors, designers, and theorists. Pays careful attention to how the play's ideas are translated into performance. Uses video, discussion, and live performance, when possible, as integral elements in the course. (III)
- THE 1116 The American Theatre** 4 QH
Focuses on the American theatre from the Revolutionary War to the present.
- THE 1118 Black Theatre in America** 4 QH
Surveys the history of black theatre artists in America from the time of Ira Aldridge to the present day. Also examines the works of black playwrights from the Harlem renaissance to the present, with an emphasis on the period beginning with Baraka's *Dutchman*.
- THE 1121 Contemporary Theatre** 4 QH
Examines the current state of commercial, regional, and other noncommercial theatre in the United States, using readings, lectures, reports, and weekly visits to theatre productions in the area. Explores through lectures the background of these types of theatre in twentieth century American and European theatre.
- THE 1127 The Comic Theatre** 4 QH
Surveys theatrical comedy from the ancient Greeks to the present. Examines the comic playwright, the comic director, and the comedic actor. Discusses theories and techniques of laughter, as well as the psychological and sociological benefits derived from laughter. Includes reading playscripts by Aristophanes, Molière, Shakespeare, Shaw, and Simon as well as viewing and listening to tapes of Chaplin, the Marx Brothers, and others. Examines comedy devices through lectures, films, records, and attending live performances.
- THE 1140 Playwriting 1** 4 QH
Emphasizes the principles and practices of modern dramatic composition: characterization, plot, plot structure, dialogue, and other dramaturgical elements as seen in the one-act play. Includes the writing of brief scenes, the dramatic composition, and the one-act play.
- THE 1149 Script Analysis for the Stage** 4 QH
Aids the theatre practitioner in developing the skills necessary for analyzing scripts in preparation for production. Focuses on dramatic theory and structure and theatrical techniques that will enable an actor, director, designer, or playwright to uncover the problems of translating theory into practice. *Prereq.* *Theatre major or minor.*
- THE 1150 Introduction to Acting** 4 QH
Focuses on fundamental techniques of stage use, the actor and the stage environment, and improvisations for strengthening imagination and increasing freedom of expression.
- THE 1155 Voice for the Theatre** 4 QH
Focuses on vocal exercises that enable the actor to better connect with the voice through freeing the physical and emotional self. Emphasizes centering, physicalization, breath support, articulation, resonance, projection, and relaxation. Includes selected monologues and/or scenes for classroom analysis.
- THE 1160 Movement 1** 4 QH
Emphasizes using the body as an expressive instrument for Realism. Develops concentration, control, and stamina through exercise, relaxation, improvisation, manipulation of energy flow, rhythms, and imagination. *Prereq.* *Theatre major or permission of instructor.*
- THE 1180 Concepts of Direction** 4 QH
Focuses on purposes and techniques of theatrical direction related to script analysis, production style, pictorial composition, rhythmic evolution, and empathic responses. *Prereq.* *THE 1150 and THE 1212.*
- THE 1200 Stagecraft** 4 QH
Focuses on principles that underlie the coordination and execution of technical production. Examines different kinds of scenery, tools, equipment, and construction materials. Lab work involves preparing technical elements of University productions. *Prereq.* *Theatre major or permission of instructor.*
- THE 1209 Theatrical Drafting** 4 QH
Exposes the student to the basic graphics language needed to translate a designer's ideas into technical drawings used for construction through work on supervised classroom projects. *Prereq.* *THE 1200.*
- THE 1210 Scenic Design for the Stage** 4 QH
Introduces the theory and practice of theatrical design and the role of the designer in the production process. Through project work, examines the use of the graphics tools—line, form, balance, color, rhythm, etcetera—in the development of the design idea. Emphasizes understanding and utilizing spatial relationships, visually expressing conceptual themes, and understanding the various uses, problems, and practical considerations of proscenium, thrust, and arena staging. Analyzes historical production styles from the Greco-Roman period through the nineteenth century. *Prereq.* *THE 1200, THE 1212, or permission of instructor.*
- THE 1212 Introduction to Theatrical Design** 4 QH
Introduces the visual effects of modern theatrical production and the creative processes by which these come into being, through a basic survey of the three major design disciplines, their supporting technology, and their working interrelationship. Addresses

the questions of how artistic concepts are developed and related, how they are communicated to other artists and an audience, and how one develops the critical processes necessary to evaluate these concepts.

THE 1213 Scene Design 2: Principles 4 QH
Focuses on the development and expression of conceptual statements from specific dramatic texts through a series of exercises involving script analysis and introductory work in rendering and model construction. Examines texts selected from works of distinct historical and stylistic periods. Studies the heritage of twentieth-century theatrical design through the work of artists such as Appia, Craig, Jones, Urban, and Oenslager. Emphasizes the development of such stylistic treatments as realism, expressionism, symbolism, and constructivist and environmental design. *Prereq. THE 1210.*

THE 1225 Scene Painting 4 QH
Traces the history of scene painting and ornament from classical to contemporary times. Focuses on studio organization, color, color theory, equipment, tools, materials, and costs involved with painting stage scenery. Uses projects and exercises in the use of different media, matching colors, painting of textures, light and shade, and the use of stencils and physical textures. Includes lab sessions involving painting stage scenery for University productions. *Prereq. THE 1200 or permission of instructor.*

THE 1226 Lighting Design for the Stage 4 QH
Examines basic principles and practices of stage lighting, including the qualities and functions of light, lighting instruments and controls, basic electricity, color in light, and analysis of the script in terms of light requirements. Expects students to develop light plots and schedules for various kinds of stage productions. Includes lab work on lighting crews for University productions. *Prereq. THE 1200, THE 1212, or permission of instructor.*

THE 1261 Costuming I 4 QH
Presents the beginning designer with the opportunity to investigate costume design theory and to foster perceptual development. Through lectures and projects, gives students the opportunity to explore both the abstract and historical aspects of costume design as well as textual analysis and its conceptual implications. (Does not require prior art or design education.)

THE 1265 Pattern Drafting and Costume Construction 4 QH
Develops the skills and techniques necessary for the patterning, cutting, and construction of costumes for the stage. Covers flat pattern drafting, draping, and finishing techniques.

THE 1280 Stage Makeup 4 QH
Focuses on the principles of, the reasons for, and the materials used in makeup for the theatre, television, and films. Includes the practical application of types and styles of makeup—straight, old-age, character, and corrective. *Prereq. Theatre major or permission of instructor.*

THE 1284 Theatre Management 4 QH
Focuses on problems of financing, promoting, and programming for profit and nonprofit professional theatre.

THE 1292 Children's Theatre 4 QH
Focuses on theories and methods of creative techniques related to children's programs in schools, churches, and recreational facilities. Analyzes literature in preparation for production of children's plays.

THE 1300 Acting 2 4 QH
Focuses on developing the actor's sense of truth and emotional freedom. Emphasizes creating, developing, and sustaining character and developing ensemble. Includes monologues and scenes performed for classroom analysis. *Prereq. THE 1150 and permission of department chair.*

THE 1301 Acting 3 4 QH
Focuses on further development of the actor's tools, script and character scoring, and exercises for physical and psychological freedom. Includes in-class scenes from works in progress. *Prereq. THE 1300 and permission of instructor.*

THE 1302 Acting 4 4 QH
Deals with scene work from a spectrum of theatrical genre. Focuses on developing a technique for approaching a role through research, character, and language. *Prereq. THE 1301 and permission of instructor.*

THE 1316 Acting for the Camera (Television) 4 QH
Presents the fundamentals of camera acting, adjusting the actor's physical responses to the mechanical eye of the camera and the delicate ear of the microphone. Involves studio work before the television camera to explore the genres of dramatic, commercial, and industrial acting. *Prereq. THE 1155, THE 1160, and THE 1302.*

THE 1325 Musical Theatre Technique 4 QH
Applies acting technique to the performance of musical material. Explores song through text and character progression, develops a process for approaching a song, and synthesizes movement, gesture, and emotion with melody, rhythm, and lyrics. Involves student performances of solo, small ensemble, and large ensemble material. Does not involve singing technique. *Prereq. THE 1150, THE 1300, and permission of instructor.*

THE 1370 Rehearsal and Performance 4 QH
Allows students to participate in public performance through preparation and rehearsals in areas of acting, directing, design, and stagemanaging. *Prereq. Permission of instructor.*

THE 1400 Costuming 2 4 QH
Offers advanced study in textual interpretation and its application to costume design. Emphasizes conceptual and stylistic development through assigned projects in the various genres of the performing arts. *Prereq. THE 1261 or permission of instructor.*

THE 1410 Technical Production 4 QH
Allows the opportunity to acquire and explore the requisite skills for developing working drawings and budgetary analyses for theatrical productions. Focuses on several projects and includes the opportunity to coordinate one substantial production. Requires that the specialized study be executed in close supervision with the instructor. *Prereq. All courses in production/design concentration and permission of instructor.*

THE 1420 Advanced Drafting and Construction 4 QH
Offers specialized study in technical production techniques. Covers drafting procedures necessary for the conversion of designer's drawings into detailed rear elevation and construction layouts, as well as the development of section, isometric, and oblique views. Through a series of practical and project exercises, analyzes the various factors governing the construction and rigging of two- and three-dimensional scenery, linear-motion, rotary-motion, and

elevating systems. Emphasizes theatrical problem solving with regard to safety, dependability, and economy. Lab fee. *Prereq.* THE 1209.

THE 1430 Lighting Design 2 4 QH

Offers an intensive study of lighting design theory and practice. Expects students to design numerous lighting plots, sections, instrument schedules, and design concepts for various types of productions and spaces. Investigates and discusses current professional techniques and practices. *Prereq.* THE 1226.

THE 1505 Continental Drama 4 QH

Covers seminal late nineteenth- and mid-twentieth-century continental drama. Focuses on playwrights whose plays had a major impact on modern drama and theatre.

THE 1510 Twentieth Century Theatre 4 QH

Studies the history of the post-naturalistic theatre in Europe and the United States. Explores the work and influence of such figures as Craig, Appia, Meyerhold, Brecht, Artaud, Grotowski, Beck and Molina, Schechner, and Chaiken.

THE 1800, THE 1801, THE 1802, THE 1803 Practicum in Production 1 QH each

Offers lab practice in technical production; can be repeated for credit (maximum four credits). *Prereq.* Departmental permission.

THE 1810, THE 1811, THE 1812, THE 1813 4 QH each

Junior/Senior Honors Project

For details contact the honors office.

THE 1820, THE 1821, THE 1822, THE 1823 Directed Study 4 QH each

THE 1840, THE 1841, THE 1842, THE 1843, THE 1844, THE 1845, THE 1846, THE 1847, THE 1848, THE 1849 4 QH each

Special Topics in Theatre Performance

Offers opportunity for in-depth examination of a subject of particular significance to the field.

THE 1860, THE 1861, THE 1862, THE 1863, THE 1864, THE 1865, THE 1866, THE 1867 Special Topics in Theatrical Design 4 QH each

Offers opportunity for in-depth examination of a subject of particular significance to the field.

THE 1890, THE 1891, THE 1892, THE 1893 4 QH each

Special Topics in Theatre History/Dramatic Criticism

Offers opportunity for in-depth examination of a subject of particular significance to the field.

Business Administration

Accounting

ACC 1111 Accounting Principles 1

4 QH

Covers the nature, function, and environment of accounting; the basic accounting model; financial and analytical ratios; the evaluation of accounts receivable; the control of inventory; the acquisition, disposal, and depreciation of plant and equipment; short- and long-term debt financing; and corporate stockholder equity. This first of a series of accounting courses assumes students do not possess knowledge of the subject. Both this course and ACC 1112 are designed to help provide an understanding of accounting issues and objectives for proper interpretation and analysis of financial accounting information. *Prereq.* *Sophomore standing.*

ACC 1112 Accounting Principles 2

4 QH

Introduces students to managerial accounting decisions through class discussions, exercises, and demonstration problems. Specific topics covered include the statement of case flows; ratio analysis; cost behavior; breakeven analysis; cost-volume-profit analysis; absorption versus variable costing; relevant cost analysis; and capital budgeting. *Prereq.* *ACC 1111 and sophomore standing.*

ACC 1331 Intermediate Accounting 1

4 QH

Constitutes the principal foundation course for accountants; includes a comprehensive review of the conceptual framework of accounting. Emphasizes the preparation of financial statements and their use in decision making. Stresses the development of accounting theory in the analysis of alternative accounting treatments and procedures. Pays particular attention to cash, accounts receivable, and inventories. *Prereq.* *ACC 1111 or equiv. and middler standing.*

ACC 1332 Intermediate Accounting 2

4 QH

Continues the study of accounting principles, concepts, and procedures introduced in ACC 1331. Emphasizes the conceptual aspects of measuring and reporting liabilities and alternative accounting treatments and procedures. *Prereq.* *ACC 1331 and middler standing.*

ACC 1339 Cost Accounting

4 QH

Develops understanding of the critical role of cost measurement in business decisions and in managing a firm's profitability. Studies alternate ways of measuring costs to meet different management objectives, the role of budgeting as a planning and management tool, and the use of cost analysis as a control tool to help management meet short- and long-term profit objectives. *Prereq.* *ACC 1112 and middler standing.*

ACC 1343 Intermediate Accounting 3

4 QH

Completes the intensive study of measurement and reporting issues of modern accounting practice. Emphasizes the conceptual and procedural aspects associated with the reporting of stockholders equity, earning per share, and deferred taxes. *Prereq.* *ACC 1332 or permission of instructor.*

ACC 1345 Accounting Systems

4 QH

Examines the process of analyzing and designing financial accounting systems. Uses a conceptual approach and cases to consider the appropriate use of computer technology in designing new systems. Covers system analysis and design concepts, files and database design, and how to control specific accounting

applications. *Prereq.* *ACC 1331, introductory computer course, or permission of instructor, and middler standing.*

ACC 1347 Auditing

4 QH

Examines audit concepts, standards, and procedures, including the auditor's legal and ethical responsibilities, the auditing profession, auditing standards, code of professional conduct, auditor's reports, evidence, internal control structure, statistical sampling, legal liability, and substantive testing. *Prereq.* *ACC 1332 or ACC 1343.*

ACC 1351 Federal Income Taxes 1

4 QH

Emphasizes basic understanding of the federal income tax structure relating to individuals. Requires completion of tax return problems and research cases directed at addressing various tax situations. Through these projects, the different sources of tax authority are introduced. *Prereq.* *ACC 1331.*

ACC 1512 Federal Income Taxes 2

4 QH

Continues the examination of the federal income tax system. Emphasizes the tax implications of property transactions and choice of business entity. Transactions between owners and business entities are also examined. A major emphasis is given to tax planning considerations, especially corporate tax consequences. *Prereq.* *ACC 1351.*

ACC 1521 Advanced Accounting

4 QH

Analyzes accounting theory and practice in various areas for the student planning a career as a professional accountant. Includes accounting for partnerships; business combinations and consolidated financial statements; bankruptcy, liquidation and reorganization; accounting for multinational enterprises; segments, interim reporting, and reporting to the SEC; and accounting for governmental units. *Prereq.* *ACC 1343 or permission of instructor.*

ACC 1591 Independent Study

1 QH

Allows students who have received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study will take place. A copy of the final report prepared by the student will be presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from area coordinators.

ACC 1592 Independent Study

2 QH

Same as ACC 1591.

ACC 1593 Independent Study

3 QH

Same as ACC 1591.

ACC 1594, ACC 1595, ACC 1596, ACC 1597 Independent Study

4 QH

Same as ACC 1591.

ACC 1711 Accounting Principles 1 (Honors)

4 QH

See course description for ACC 1111.

ACC 1712 Accounting Principles 2 (Honors)

4 QH

See course description for ACC 1112.

ACC 1891 Honors Thesis in Progress**0 QH****ACC 1892 Honors Thesis****8 QH****ACC 1893 Honors Thesis in Progress****0 QH****ACC 1894 Honors Thesis****12 QH****Entrepreneurship****ENT 1330 Entrepreneurship****4 QH**

Introduces entrepreneurship, focusing on the following questions: What is entrepreneurship and how do you become an entrepreneur? How do you find or create ideas that might become businesses? How can you determine if the ideas have merit in the marketplace? How do you start a firm that, from the beginning, is market oriented and focused on what customers need and are willing to buy? Gives students an opportunity to conduct detailed evaluations of new business ideas.

ENT 1344 Starting and Managing a New Business**4 QH**

Identifies the key principles and practices needed to start a business from the initial idea to the management of profits and further expansion. Covers such topics as alternative approaches to business entry, initial team building, managing interactions with initial customers, establishing control systems, legal matters, and building necessary external relationships. Gives students an opportunity to analyze a new venture.

ENT 1352 Planning and Growing New Ventures**4 QH**

Focuses on how entrepreneurs turn small businesses into larger businesses. Includes planning, forecasting sales, increasing production, designing new products or services, designing distribution and managing a sales force, managing personnel, using strategic linkages with other companies to increase market presence, and working with a growing customer base. Discusses how to manage a small firm in hard financial times. Offers students an opportunity to develop comprehensive business plans for new or existing businesses as term projects.

ENT 1358 Small Business Institute**8 QH**

Provides students with an opportunity to apply their business training through an analytical, problem-solving technique learned in the classroom. Expects student teams to interact with owners and managers of local small businesses to analyze problems and opportunities and develop recommendations, and to devote the equivalent of two days per week to collecting information. Combines experience with occasional class meetings and frequent team meetings with a faculty member. Sponsored by the United States Small Business Administration (SBA). Requires students to present interim progress reports and final written and oral reports to the client company and the SBA. *Prereq.* Junior standing or permission of instructor.

ENT 1591 Independent Study**1 QH**

Allows students who have received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study will take

place. A copy of the final report prepared by the student will be presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from area coordinators.

ENT 1592 Independent Study**2 QH**

Same as ENT 1591.

ENT 1593 Independent Study**3 QH**

Same as ENT 1591.

ENT 1594, ENT 1595, ENT 1596, ENT 1597 Independent Study**4 QH**

Same as ENT 1591.

ENT 1598 Independent Study**8 QH**

Same as ENT 1591.

ENT 1891 Honors Thesis in Progress**0 QH****ENT 1892 Honors Thesis****8 QH****ENT 1893 Honors Thesis in Progress****0 QH****ENT 1894 Honors Thesis****12 QH****Finance and Insurance****FIN 1201 Personal Finance****4 QH**

Focuses on management of the total personal estate: budgeting, savings, insurance, investments, borrowing, taxes, Social Security, pensions, annuities, securities markets, mutual funds, and their integration. *Not open to College of Business Administration students.*

FIN 1333 Financial Institutions and Markets**4 QH**

Explores the financial environment faced by a firm as well as the financial institutions serving the economy. Discusses the forces that determine the changes in money and capital markets and explores the implications of changing financial environment for the management of funds in a firm and/or financial institution. *Prereq.* ACC 1112 and middler standing.

FIN 1335 Managerial Finance**4 QH**

Provides students the opportunity to gain knowledge of the advanced tools and concepts used in the management of funds. Topics include inventory and credit policies, risk, capital budgeting, financial structure, cost of capital, dividend policy, and valuation of a firm. Overall financial strategy and timing of its implementation are also examined. Specialized topics—mergers and acquisitions, financial failure, and financial policy for multinational firms—may be considered in the course. *Prereq.* FIN 1439.

FIN 1346 Investment Management**4 QH**

Presents a broad overview of the concepts, practices, and procedures of investment management. Covers basic security types, security market operations, security analysis (both fundamental and technical), and an introduction to portfolio management. *Prereq.* FIN 1439.

FIN 1438 Principles of Finance I**4 QH**

Familiarizes students with the concepts, tools, practices, and procedures in financial management. Covers valuation, financial

analysis and planning, risk management, and capital budget. Uses problems, case discussions, and spreadsheet analysis to enhance student understanding of financial concepts. *Prereq.* ACC 1111, MSC 1200, and middler standing.

FIN 1439 Principles of Finance 2 **4 QH**

Continues FIN 1438. Covers working capital planning and management, issues in capital structure and long-term financing, international finance, and special topics. Emphasizes understanding financial concepts and applying them to real world problems. Uses problems, case discussions, and spreadsheet analysis to enhance student understanding of financial concepts. *Prereq.* ACC 1112, MSC 1201, and middler standing.

FIN 1503 Taxes and Financial Decisions **4 QH**

Uses the case method to discuss a number of financial decisions that are greatly influenced by tax considerations, the most important of which are concerned with capital structure, dividend policy, acquisition terms, investment policies, and liquidations. The federal income tax receives primary consideration, but state and foreign taxes are also discussed. *Prereq.* FIN 1439 and middler standing.

FIN 1520 Options and Futures Markets **4 QH**

Explores the relatively new concepts of financial futures, options on financial futures, and listed options markets as developed to help corporations and financial institutions manage interest-rate risk. Topics include mechanics of these markets, techniques that can hedge interest rate exposure, tracing methods, and current developments in the field. *Prereq.* FIN 1346.

FIN 1526 Securities Markets **4 QH**

Analyzes the operation of the securities market. Provides students the opportunity to examine in detail the operation and function of investment bankers, broker-dealers, and securities exchanges. Studies the mechanics of cash and margin accounts, trading options, and regulations affecting securities markets. *Prereq.* FIN 1439.

FIN 1530 Working Capital Management **4 QH**

Examines strategies and analytical approaches to managing current assets and current liabilities. Explores corporate cash management under changing money market conditions. Discusses the use of interest rate futures and working capital management in a multinational context. *Prereq.* FIN 1439.

FIN 1531 Capital Investment Decision Analysis **4 QH**

Analyzes capital budgeting techniques and portfolio considerations, including risk analysis, capital structure and valuation, and other long-term corporate finance topics. *Prereq.* FIN 1439.

FIN 1538 Financial Ethics **4 QH**

Investigates and helps develop a systematic understanding of ethical dilemmas of financial business decision making. Examines the influence of business cultures on personal behavior, combining wisdom of the past with current ethical thinking and each individual's standards. *Prereq.* FIN 1438.

FIN 1540 Management of Financial Institutions **4 QH**

Studies the decision-making problems faced by financial institutions such as commercial banks, savings and investment institutions, and finance companies when viewed as competitive, profit-seeking business entities. Covers such topics as the nature and scope of the capital markets confronting institutions, specialized problems regarding the sources and uses of funds of financial institutions, the nature of competition, the regulation of

financial institutions, and strategic policy planning of financial institutions. *Prereq.* FIN 1439 or FIN 1333.

FIN 1543 Modern Portfolio Management **4 QH**

Analyzes the methods of selection, revision, and performance measurement of asset portfolios. Exposes the students to the current methods of building an asset portfolio. Presents and evaluates the concept of the efficient frontier of assets in the risk-return space. Includes a simulated equity fund-management project, in which students select equity securities and then prepare and present annual reports evaluating their portfolios' construction and performance. *Prereq.* FIN 1346.

FIN 1544 Bank Management **4 QH**

Examines the financial management of commercial banks and thrift institutions. Analyzes the problems of liquidity and investment management, loan portfolio and capital management, and pricing problems associated with various sources and uses of funds in the context of changing economic and regulatory environment for these institutions. Presents lectures, discussions, and cases. *Prereq.* FIN 1439 or FIN 1333.

FIN 1545 Investment Banking **4 QH**

Focuses on the managerial functions of investment banking firms. Examines individual investors and institutions in the money and capital markets from the viewpoint of investment banking firms. Familiarizes students with the operating and cash flow characteristics of institutional and individual clients. *Prereq.* FIN 1439.

FIN 1549 Principles of Real Estate **4 QH**

Surveys the field of real estate, including principles of real estate law, valuation, brokerage, finance, land use, and negotiations. Gives the student the opportunity to become a better decision maker and to prepare for future studies in real estate. *Prereq.* FIN 1439.

FIN 1550 Real Estate Finance: Analysis and Investment **4 QH**

Presents real estate financing techniques, sources of funds, and investment property analyses. Examines the legal and financial aspects of such techniques as mortgage liens, leaseholds, contracts for deed, and sale-leasebacks, as well as the primary and secondary mortgage markets. Surveys methods of valuing income properties. *Prereq.* FIN 1549.

FIN 1562 Employee Benefits Management **4 QH**

Covers the design, implementation, and financing of corporate employee benefit plans. Presents a comprehensive analysis of qualified and non-qualified benefit and executive compensation plans. Emphasizes the proper management, design, and financing of these plans to achieve corporate goals at minimum feasible cost. Studies alternative methods of financing benefit and executive compensation plans. Includes recent developments in Social Security, benefits, and tax legislation. *Prereq.* FIN 1439.

FIN 1566 Risk Management and Insurance **4 QH**

Emphasizes the functional area of corporate risk management. Covers such areas as organizing and controlling the risk management function; identifying, measuring, controlling, and financing risk; selecting the best method of risk treatment; and implementing and monitoring risk management. Topics of exposure analysis include property, liability (public, employer, products, officers and directors, and professionals), income, and extraordinary expense losses. Covers treatment methods such as self-insurance, off-shore captive, retention groups, and commercial insurance.

Includes recent developments such as tort reform integration of risk management with modern financial theory, as well as implications and analysis of recent tax reforms. *Prereq.* FIN 1439.

FIN 1580 Personal Financial Management 4 QH
Emphasizes the development of personal financial management expertise, based on an integrated plan for personal choices. Focuses on an overall personal economic plan and unites such diverse topics as inflation and investment selection, insurance, short- and long-run hedges against the purchasing power risk, and purchasing assets. Encourages decision making through analyzing alternative courses of action. *Prereq.* FIN 1438.

FIN 1582 Personal Insurance Planning 4 QH
Focuses on the informed decisions necessary to establish a comprehensive, rational plan of personal insurance. Examines through class discussion, lectures, and readings the various kinds of personal insurance and how to create an insurance package for clients with different insurance needs. *Prereq.* FIN 1438.

FIN 1591 Independent Study 1 QH
Allows the student who has received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study will take place. A copy of the final report prepared by the student will be presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from area coordinators.

FIN 1592 Independent Study 2 QH
Same as FIN 1591.

FIN 1593 Independent Study 3 QH
Same as FIN 1591.

FIN 1594, FIN 1595, FIN 1596, FIN 1597 Independent Study 4 QH each
Same as FIN 1591.

FIN 1738 Principles of Finance 1 (Honors) 4 QH
Acquaints students with basic processes, principles, tools, and concepts of finance. Topics include financial analysis, financial forecasting, profit planning, budgeting, working capital management, and capital budgeting. Covers the basics of financial markets, institutions, and sources of supply of different types of funds available to a firm. *Prereq.* ACC 1112, MSC 1201, and middler standing.

FIN 1739 Principles of Finance 2 (Honors) 4 QH
Continues FIN 1738. Builds upon the basic set of analytical tools and stresses application. Covers advanced capital budgeting, cost of capital, and long-term financing. Examines the implications of a firm's choice of capital structure and dividend policies. *Prereq.* FIN 1438 or FIN 1738.

FIN 1759 International Financial Markets 4 QH
Introduces international financial markets, including balance of payments, history of the international monetary system, exchange-rate determination, foreign-exchange-exposure hedging strategies, and international capital markets. Emphasizes how

international financial markets work and how corporations must adapt their decision-making to the international environment. *Prereq.* FIN 1439.

FIN 1760 International Financial Management 4 QH
Examines how the financial strategies and policies of multinational corporations differ from domestic corporations and how financial management is utilized in an international setting to achieve corporate goals. Specific topics include cost of capital, capital budgeting, capitalization policies, and management techniques for dealing with exchange-rate exposure and working-capital issues. Knowledge of exchange rates is assumed. *Prereq.* FIN 1759.

FIN 1770 Small-Business Finance 4 QH
Uses basic processes, principles, tools, and concepts of finance within the parameters of a small business to develop a complete financial plan that projects the future circular flow of funds by analyzing and then integrating the impact of both investment decisions (use of funds) and financial decisions (source of funds). *Prereq.* FIN 1439.

FIN 1814 Financial Forecasting 4 QH
Discusses how accurate forecasts of product demand, retail sales, and cash-flow levels are critically important for companies regardless of size. Covers how effective financial forecasting integrates macroeconomic factors, particularly the business cycle, and institutional factors with appropriate quantitative methods. Addresses both issues—economic or business cycles and forecasting techniques—in sufficient depth so that students can obtain the skills necessary to build and interpret a basic forecasting model for business. *Prereq.* Honors participation or permission of instructor.

FIN 1816 Economic Decision Making in the Global Environment (Honors) 4 QH
Simulates global competition to enable students to develop and execute a strategy to propel their company to the top ranks in the US, Europe, and Asia. Considers such issues as new product development, selection of product attributes, calculation of demand, least-cost financing of investments, fluctuating foreign exchange rates, cost-minimizing versus product differentiation strategies, and aggressive versus defensive posturing. Emphasizes “winning” the competitive battle in terms of key economic variables while attempting to satisfy stakeholders and avoid interference by government antitrust authorities. *Prereq.* Honors participation or permission of instructor.

FIN 1818 Turnaround Management (Honors) 4 QH
Examines strategies for identifying companies likely to fail and selecting and implementing remedial actions. Covers such topics as business turnarounds, troubled companies, workouts, bankruptcies, and liquidations, using case studies and readings. Students will evaluate a turnaround plan. *Prereq.* Honors participation or permission of instructor.

FIN 1891 Honors Thesis in Progress 0 QH

FIN 1892 Honors Thesis 8 QH

FIN 1893 Honors Thesis in Progress 0 QH

FIN 1894 Honors Thesis 12 QH

Human Resources Management

HRM 1332 Introduction to Human Resources Management 4 QH

Helps students develop understanding of contemporary issues in human resource management. Examines problems posed by changing work patterns, labor force characteristics, union activities, and government policies. Discusses and evaluates organizational experiments such as worker participation, job enlargement, and group incentives from a managerial perspective. *Prereq. Middler standing.*

HRM 1345 Contemporary Labor Issues 4 QH

Studies current issues dealing with labor in its broadest sense. Discusses and evaluates labor unions and manpower institutions as well as the emerging development and training problems motivated by unemployment, poverty, and changing work patterns. Reviews recent legislation dealing with the employment relationship. *Prereq. Middler standing.*

HRM 1348 Reward Systems: Wage, Salary, and Benefits Administration 4 QH

Examines one of the major functions of personnel administration—compensation management—and its part in the overall personnel programs of the organization. Develops through simulation exercises, group projects, lectures, and cases an analysis of reward systems as supportive mechanisms of management and the formulation of compensation policy and implementation of compensation systems. *Prereq. Middler standing.*

HRM 1349 Selection and Assessment of Employees 4 QH

Examines three influences of employee selection and testing: the legal aspect of selection, where the greatest uncertainty is found; the influence of industrial psychology on selection and decision-making techniques; and the area of personnel practices itself, that is, the methods employers find effective in coping with legal requirements. Covers basic issues and procedures such as EEO, decision strategies, and the utility and evaluation of selection and appraisal systems. *Prereq. Middler standing.*

HRM 1431 Complex Organizations 4 QH

Examines the structure and dynamics of the complex organization. Focuses on the design of the organization and its basic subsystems (reward, control, selection, development). Explores how organizational structures help shape human behavior. Emphasizes understanding the interrelations among organizational structures, tasks, and individual characteristics within the context of a changing environment. *Prereq. Middler standing.*

HRM 1432 Organizational Behavior 4 QH

Explores the effects of individual, interpersonal, group, and leadership factors on human behavior. Also explores managerial applications of behavioral and social science concepts, including job design, job satisfaction, performance appraisal, supervision, career dynamics, and organizational change. Emphasizes helping the student develop skills in dealing with the human side of enterprise. *Prereq. Middler standing.*

HRM 1433 Organizational Behavior and Design 8 QH

Covers the material from HRM 1431 and HRM 1432. The structure and dynamics of the complex organization are examined, focusing on the design of the organization and its basic subsystems. The effects of individual, interpersonal, group, and leadership factors on human behavior are also examined. Students have the opportunity to explore how organizational structures help shape human behavior and to develop skills in dealing with the human side of enterprise. *Prereq. Middler standing.*

HRM 1508 Participative Management 4 QH

Examines participative management, a range of techniques that may enhance employee involvement in decision making. Studies the motivational basis for participative programs, describes the forms and techniques available, and examines criteria for evaluating effectiveness. Considers internal and external organizational factors that may affect overall success of participation and discusses cultural and social aspects of participative management in an international business environment. *Prereq. Middler standing.*

HRM 1510 Managing and Surviving in Turmoil and Transition 4 QH

Focuses on the business environment of today and tomorrow and what effective management will require to create adaptive, flexible, self-correcting, and constantly improving organizations—a set of tools that will become standard equipment in tomorrow's organization. These tools will include understanding the complex interaction among systems, structures, and practices as well as provide the techniques needed to facilitate transition, growth, adaption, and organizational learning. Focuses on the topic areas of work teams, participative management, managing and surviving change, creating a climate for innovation, and building group and organizational commitment.

HRM 1517 Managing Power and Influence 4 QH

Examines the effective use of power and political processes in organizations. Considers the philosophical and social psychological foundations of social influence strategies and tactics, and develops clinical skills for seeing, recognizing, and utilizing these strategies and tactics in ways that are organizationally effective and socially responsible. Presents information with the expectation that familiarity and sensitivity to the dynamics surrounding the use of power and influence will provide both insulation and awareness for students as they deal with these issues in their managerial careers.

HRM 1519 Leadership 4 QH

Studies the leadership function in a variety of organizational settings. Uses a contingency approach to help students explore a range of possible leadership behaviors, relating the appropriateness of a particular style to a number of situational factors. Readings provide an opportunity to explore several contingency theories of leadership; cases allow for the application of these models; and videotaped role playing and self-assessment techniques permit students to evaluate their own leadership style. *Prereq. Middler standing.*

HRM 1539 Managing Careers 4 QH

Surveys the tools for both self-assessment (investigating one's skills, abilities, needs, values, and interests) and career exploration (determining the nature of and requirements for entering and succeeding in various career fields). Helps students develop an individualized plan of action that summarizes a wide variety of data indicating an individual's present status and career goals and the means by which to bridge the gap. *Prereq. Middler standing.*

HRM 1581 Managerial Skills Seminar 4 QH

Studies and develops specific behavioral and interpersonal skills critical for managerial success, particularly those most vital early in management careers, in a seminar/workshop format. Uses introspective and experiential exercises and role plays extensively and discusses specific work assignments. *Prereq. Middler standing.*

HRM 1585 Managing Human Resources: The Legal Environment 4 QH

Studies the recent legal developments affecting the management of human resources. Examines recent state and federal laws that

will influence managerial policies and practices in areas such as employment testing, hiring and promotion, controlling unemployment compensation and Worker's Compensation claims, and responding to OSHA and ERISA regulations. *Prereq. Middler standing.*

HRM 1591 Independent Study 1 QH
Allows a student who has received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study will take place. A copy of the final report prepared by the student will be presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from area coordinators.

HRM 1592 Independent Study 2 QH
Same as HRM 1591.

HRM 1593 Independent Study 3 QH
Same as HRM 1591.

HRM 1594, HRM 1595, HRM 1596, HRM 1597 Independent Study 4 QH each
Same as HRM 1591.

HRM 1760 International Labor Relations Systems 4 QH
Analyzes labor relations systems of selected countries in comparison with that of the United States. Also studies the political, cultural, and economic forces that shaped these systems. Gives special attention to such international institutions as multinational companies and the EEC. Cases, readings, and projects assigned. *Prereq. Middler standing.*

HRM 1762 Managing People in International Settings 4 QH
Covers basic issues in human resources management relevant to managing in international and cross-cultural environments. Examines selection and training of personnel for work in multicultural environments, managing the international employee in the United States and abroad, cross-cultural communication, international environments, special issues of concern to small business, and change in multinational companies. *Prereq. Junior standing.*

HRM 1814 Managing Ethical Dilemmas in Business (Honors) 4 QH
Considers the ethical dilemmas that arise for managers whenever individual goals collide with larger responsibilities to the community, co-workers and employees, and the organizations to which they belong. Aims to increase awareness of, ability to analyze, and skills to cope with the often conflicting responsibilities and alternatives that underlie managerial dilemmas. Uses a seminar approach to explore managerial dilemmas across functional areas and to develop applied case scenarios. *Prereq. Honors participation or permission of instructor.*

HRM 1891 Honors Thesis in Progress 0 QH

HRM 1892 Honors Thesis 8 QH

HRM 1893 Honors Thesis in Progress 0 QH

HRM 1894 Honors Thesis 12 QH

International Business Administration

INB 1338 Introduction to International Business 4 QH
Focuses on the cultural, economic, and political aspects of domestic and foreign environments and their effect on the international operations of business firms. Topics include the principles, patterns, and potential of international trade and investments; the development of management strategies for international businesses; and the organization and management of the firm's international operations. *Prereq. Middler standing.*

INB 1352 Seminar in International Business 4 QH
Applies the concepts and skills acquired in other international and domestic courses. Focuses on solving managerial problems in international and multicultural contexts. Uses case analysis to focus on business strategy and policy related to international operations. Requires significant class participation, written analysis, and understanding of current issues. *Prereq. INB 1338 and senior standing.*

INB 1731 Cultural Aspects of International Business 4 QH
Covers, from a managerial perspective, issues that arise when a firm moves from its home country to a host country that has a different national culture. Focuses on United States-based firms that operate abroad. Also considers what happens to other nation's firms operating in the United States and in third-country environments. Analyzes how "corporate culture" evolves in the context of national culture and the impact on managers. *Prereq. Middler standing.*

INB 1735 Import and Export Management 4 QH
Covers the principles and practices of international trade through import and export. Focuses on management aspects and explores details required to engage all aspects of international trade. Topics include government regulations, transportation, insurance, marketing, and finance.

Management

MGT 1115 Introduction to Business 4 QH
Introduces the basic functions of management, team-taught by faculty from all areas of the College of Business Administration. Examines academic choices and career opportunities in business.

MGT 1345 Legal Aspects of Business 4 QH
Examines the legal aspects of business transactions and business relationships involving contracts and sale of goods under the Uniform Commercial Code, as well as product liability and agency law.

MGT 1446 Managing Social Issues 4 QH
Focuses on the legal, social, ethical, and economic influences as well as domestic and international cultural factors affecting business. Treats various ways the manager can respond to these influences. Topics include the several possible models of the business and society relationship; the foundations of personal and managerial ethics; the business, government, and society inter-relationships; ways the manager can address various stakeholder interests; and strategic and corporate public policy consequences of management's responses to specific social issues. *Prereq. Junior standing.*

MGT 1450 Business Policy	4 QH	MGT 1592 Independent Study	2 QH
Focuses on corporate strategy and its elements, including an analysis of the company, its resources, opportunities, environment, and decision makers. Emphasizes decision making and implementation of strategy while operating a company in the context of a business simulation. <i>Prereq.</i> Senior standing.		Same as MGT 1591.	
MGT 1572 Law of Wills, Trusts, and Estates	4 QH	MGT 1593 Independent Study	3 QH
Examines requirements of valid will, claims of and against estates; the administration of estates, both formal and informal; essential elements for the creation of a trust; kinds of trusts, including inter vivos and testamentary trusts; the rights, responsibilities, and liabilities of trustees; and the rights of beneficiaries. <i>Prereq.</i> Middler standing.		Same as MGT 1591.	
MGT 1573 Bulk Sales and Bankruptcy	4 QH	MGT 1594, MGT 1595, MGT 1596, MGT 1597 Independent Study	4 QH each
Examines bulk transfers, with detailed study of the Uniform Commercial Code, Article 6; the need of the transferor to give to the transferee a sworn list of all his creditors; the giving of notice to the listed creditors; the contents of the notice, what creditors are protected; and the legal consequences of failure to comply with the Code. Also deals with both voluntary and involuntary bankruptcies; the appointment and duties of the trustee; provable and dischargeable debts; priority of debts; discharge and acts that bar a discharge. <i>Prereq.</i> Middler standing.		Same as MGT 1591.	
MGT 1574 Law in Society	4 QH	MGT 1720 Labor Law	4 QH
Provides students the opportunity to acquire a broad view of their legal rights, obligations, and responsibilities in their relations with others and with the state. Includes study of torts, such as assault and battery, trespass, negligence, slander, libel, and deceit, and crimes such as homicide, assault and battery, robbery, arson, larceny, and burglary. <i>Prereq.</i> Middler standing.		Helps acquaint the student with the many constitutional and legal problems involved in labor organizing, industrial relations, labor negotiations, labor contract enforcement, and dispute resolution. Examines cases for the legal principles underlying the common law, state and federal laws, and the constitutional questions of power and authority. Also considers the Sherman Act, Clayton Act, Norris-LaGuardia Act, and Labor Management Relations Act. <i>Prereq.</i> Middler standing.	
MGT 1575 Negotiations	4 QH	MGT 1820 Independent Study (Honors)	4 QH
Focuses attention on the strategies and techniques employed in the negotiations process. Includes familiarization with related literature, student role-playing, and interaction with professionals involved in private and public sector negotiations.		Offers directed study toward fulfillment of Honors Program requirements and is open only to students who have been accepted into the Honors Program. Procedures for arranging the honors independent study are the same as those for MGT 1594.	
MGT 1580 Intercultural Negotiation and Conflict	4 QH	MGT 1832 Managing Product Innovation in Large Companies (Honors)	4 QH
Focuses on effective management in multicultural environments and the need for negotiating skills beyond basic bargaining tools. Considers such psychological and sociological factors as stereotyping, discrimination, biculturalism, intercultural conflict, cultural factors in negotiation, and cultural hegemony. Provides the opportunity to apply these and related ideas to such practical situations as negotiating relationships among intercultural groups, negotiating across cultures, and understanding relationships between competing cultures.		Introduces conventional, single-product approaches to product development and then considers innovation from a series of broader managerial and technological perspectives, combining theory and applications. <i>Prereq.</i> Honors participation or permission of instructor.	
MGT 1591 Independent Study	1 QH	MGT 1891 Honors Thesis in Progress	0 QH
Allows the student who has received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study will take place. A copy of the final report prepared by the student will be presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from area coordinators.		MGT 1892 Honors Thesis	8 QH
		MGT 1893 Honors Thesis in Progress	0 QH
		MGT 1894 Honors Thesis	12 QH
Management Science			
		MSC 1200 Business Statistics 1	4 QH
		Studies statistics, which is the methodology concerned with data collection, analysis, and interpretation. Discusses the information that is generated by statistical methods and used for analyzing decisions in the face of uncertainty. Introduces fundamental concepts and methodology of statistics, probability distribution, estimation, and hypothesis testing. <i>Prereq.</i> MTH 1114.	
		MSC 1201 Business Statistics 2	4 QH
		Continues topics covered in MSC 1200. Includes chi-square tests, simple and multiple regression-correlation analysis, and elementary concepts of time series analysis. <i>Prereq.</i> MSC 1200.	
		MSC 1226 Introduction to Computer Applications in Business	4 QH
		Introduces personal computers with business applications, as well as microcomputers, spreadsheets, word processing, and databases. Covers the basic information systems concepts. Requires students to analyze a business case, applying their technology and problem-solving skills.	

MSC 1330 Data Management**4 QH**

Builds on the functional skills learned in MSC 1226. Covers database design, selection and use of a database software package, security and privacy, viruses, and data recovery. Expects students to create a small database complete with data entry screens and management reports. *Prereq.* MSC 1226.

MSC 1332 Decision Support Systems for Business**4 QH**

Provides students with an understanding of the impact of computer-based tools on business decision making. Builds upon the computer literacy foundation established in MSC 1226. Covers decision support software such as graphics and expert systems on both mainframe and microcomputers. Gives students the opportunity to build a decision support system and create the supporting system documentation and user manual in a course project. *Prereq.* MSC 1226.

MSC 1335 Telecommunications and Networks**4 QH**

Reviews business telecommunications. Focuses on the design, management, and use of data, video, and voice networks. Provides an overview of different operating systems, network topology, and management. Covers business uses of electronic communication such as Electronic Data Interchange and electronic mail, teleconferencing, and distributed applications. Explores the impact of telecommunications on business operations and competitive strategy. Includes assignments that give hands-on experience with network technology and a research paper about the business impact of telecommunications. *Prereq.* MSC 1226.

MSC 1336 Business Programming**4 QH**

Provides students with a first course in programming, using the language C++. Introduces the logical structure of a programming language, object oriented programming, and data structures. *Prereq.* MSC 1226.

MSC 1341 Information Resource Management**4 QH**

Examines the major organizational and managerial issues associated with using information systems in business. Includes a discussion of security and control in accounting information systems, time and quality issues in manufacturing information systems, and the strategic use of information technology to gain competitive advantage. *Prereq.* MSC 1226 and junior standing.

MSC 1342 Business Systems Integration**4 QH**

Explores strategies for the functioning integration of information systems in both the office and the factory by examining actual problems in company settings, analyzing their data needs, and recommending a strategy for data and architecture. *Prereq.* MSC 1226, MSC 1330, and MSC 1335.

MSC 1350 Data Management**4 QH**

Builds on the functional skills learned in MSC 1226, exposing students to the essentials of data management. Includes database design, selection and use of a database software package, security and privacy, viruses, and data recovery. Includes a project that requires students to create a small database complete with data entry screens and management reports. *Prereq.* MSC 1226.

MSC 1433 Quantitative Models in Business**4 QH**

Focuses on the construction of appropriate mathematical models (simplified representations or abstractions of reality) for managerial decision-making problems. Discusses criteria for selecting various stochastic and deterministic models. Covers decision trees, decision analysis, linear programming, and simulation. *Prereq.* MSC 1201.

MSC 1441 Operations Management**4 QH**

Considers the productive system of an enterprise whereby inputs of technology, materials, personnel, and information are transformed into useful goods and/or services. Introduces the types of problems and issues encountered by the operations manager. Discusses various models and techniques but emphasizes problem formulation and managerial implications.

MSC 1501 Purchasing and Materials Management**4 QH**

Examines decisions related to the flow of materials from supplier to point of use. Emphasizes problems related to purchasing, including negotiation, value analysis, and supplier selection. Emphasizes materials management in manufacturing organizations, but also covers nonprofit and non-manufacturing concerns. Applies latest research in field gleaned from projects sponsored by the National Association of Purchasing Management and the American Production and Inventory Control Society. *Prereq.* MSC 1441.

MSC 1553 Decision Analysis**4 QH**

Focuses on the analysis of decision making, with particular emphasis on realistic problems under uncertainty. Aims to help improve the student's ability to make better decisions through a careful consideration of alternative courses of action and their consequences, relevant objectives, and the element of risk. Covers the basic components of decision problems, the concepts of risk and utility, decision trees, and value of information and multicriteria decision-making. *Prereq.* MSC 1201.

MSC 1566 Quality Management**4 QH**

Examines the basic philosophy of quality and its management both in Japan and in the United States. Stresses the changing role of quality as an emerging strategic factor in the United States. Discusses managerial, behavioral, and statistical methods based on measurement for achieving quality. Introduces the student to various aspects of quality management relevant to lower, middle and upper level of management; quality control circles; quality and continuous process improvements; and the philosophy of quality experts such as Deming, Juran, and Ishikawa. *Prereq.* MSC 1200, MSC 1201, and MSC 1441.

MSC 1591 Independent Study**1 QH**

Allows the student who has received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study will take place. A copy of the final report prepared by the student will be presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from area coordinators.

MSC 1592 Independent Study**2 QH**

Same as MSC 1591.

MSC 1593 Independent Study**3 QH**

Same as MSC 1591.

MSC 1594, MSC 1595, MSC 1596, MSC 1597 Independent Study**4 QH each**

Same as HRM 1591.

MSC 1700 Business Statistics I (Honors)**4 QH**

See course description for MSC 1200.

MSC 1701 Business Statistics 2 (Honors)

See course description for MSC 1201.

MSC 1726 Introduction to Data Processing (Honors)

See course description for MSC 1226.

MSC 1826 Business Forecasting (Honors)

Focuses on analyzing data using statistical models from various functional areas of business. Students prepare reports based on actual data that emphasize forecasting.

MSC 1828 Strategies for Environmentally Responsible Organizations

Discusses how management decisions regarding product design, production methods, facility location and distribution channels, and service policies may have direct environmental consequences. Focuses on the operational strategies and tactics in manufacturing and non-manufacturing organizations that deal with environmental problems. Reviews federal and state environmental policy and legislation and examines the specific actions of producers and service producers. *Prereq. Honors participation or permission of instructor.*

MSC 1891 Honors Thesis in Progress**MSC 1892 Honors Thesis****MSC 1893 Honors Thesis in Progress****MSC 1894 Honors Thesis****4 QH****4 QH****4 QH****4 QH****0 QH****8 QH****0 QH****12 QH**

Marketing

MKT 1331 Marketing Management

Provides training in marketing decision making. Uses case studies simulating actual business settings to help students develop analytical abilities and sharpen their communications skills. Covers topics that range from techniques used to analyze a market to the development of a total marketing strategy (product policy, pricing policy, promotion policy, and distribution policy). *Prereq. MKT 1435 and middler standing.*

MKT 1341 Marketing Research

Focuses on the survey research process and the analysis of data using "canned" computer programming routines. Covers topics such as problem definition, research design, sampling techniques, questionnaire development, data collection methods, and data analysis. Students expected to work on group projects with participating firms. Requires no previous computer experience. *Prereq. MKT 1331 and MSC 1201.*

MKT 1351 Competitive Strategy

A capstone marketing course, required of all students with a marketing concentration. Focuses on the formulation of marketing strategy at a policy level and its implementation in a dynamic environment. *Prereq. MKT 1331, MKT 1341, and senior standing.*

MKT 1435 Introduction to Marketing

Consists of lectures, readings, and small-group discussions on the role of marketing in contemporary society, in the business enterprises, and in the nonprofit organization. Considers the planning, operation, and evaluation of marketing and promotional efforts necessary to the effective marketing of consumer and industrial products and services in both profit and nonprofit organizations. *Prereq. Middler standing.*

4 QH**4 QH****4 QH****4 QH****0 QH****8 QH****0 QH****12 QH****MKT 1501 Introduction to Retailing**

Explores the range of retail firms that make up the retailing industry, from large mass merchandisers to small specialty outlets. Examines the functions, practices, and organizations of various store types. Considers such topics as current issues, career opportunities, the environment of retailing and retailing's role in the economy. *Prereq. Middler standing.*

4 QH**MKT 1503 Retail Merchandising and Control**

Examines the concepts and techniques of store operations and merchandise management. Considers topics such as calculating and planning markups and markdowns, pricing, inventory control, stock turn, open-to-buy, profitability analysis, and expense control. *Prereq. MKT 1435 or permission of instructor.*

4 QH**MKT 1523 Advertising Management**

Focuses on the management of the advertising function in relation to a firm's overall marketing objectives. Approaches the subject from the perspective of the user of advertising (for example, the product manager and the marketing manager). Uses case studies and text material to help the student develop decision-making skills. *Prereq. MKT 1331 and middler standing.*

4 QH**MKT 1531 Sales Management**

Provides training in effective selling skills and how to manage accounts. Discusses how customers buy products and services and how this relates to a company's sales process: prospecting accounts, making sales presentations, handling customer objections, closing sales, and post-sale servicing of accounts. Also covers current approaches such as relationship and partnership selling. *Prereq. MKT 1331 and middler standing.*

4 QH**MKT 1542 Industrial Marketing**

Examines the marketing of products where business firms are the potential customers. Upperclass elective, open to juniors and seniors. *Prereq. MKT 1331 and middler standing.*

4 QH**MKT 1545 New Product Development**

Focuses on the challenges and decisions managers face in creating, developing, launching, and managing new products and services. Special emphasis is given to the stages of the new product development process, the information needs in each stage, and approaches for gathering needed information. *Prereq. MKT 1331.*

4 QH**MKT 1553 Foundations of Consumer Behavior**

Helps students develop an understanding of consumer attitudes and behavior processes as the basis of the design of marketing problems. Considers economic and behavioral models of consumer behavior and underlying behavioral theories and concepts. *Prereq. MKT 1331 and middler standing.*

4 QH**MKT 1591 Independent Study**

Allows the student who has received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study will take place. A copy of the final report prepared by the student will be presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from area coordinators.

1 QH

MKT 1592 Independent Study Same as MKT 1591.	2 QH	through individual research topics selected for class presentation/discussion. <i>Prereq.</i> Senior standing or permission of instructor.	
MKT 1593 Independent Study Same as MKT 1591.	3 QH		
MKT 1594, MKT 1595, MKT 1596, MKT 1597 Independent Study Same as HRM 1591.	4 QH each		
MKT 1735 Introduction to Marketing (Honors) Explores the role of marketing in contemporary society, business enterprises, and nonprofit organizations through lectures, readings, and small group discussions. Considers planning, operating, and evaluating marketing and promotional efforts that are necessary to effectively market consumer and industrial products and services in both profit and nonprofit organizations. <i>Prereq.</i> Middler standing and honors participation.	4 QH		
MKT 1760 International Marketing Introduces those aspects of marketing that are unique to international business within the framework of traditional functional areas of marketing. Focuses on the environment and the modifications of marketing concepts and practices necessitated by environmental differences. Includes such topics as cultural dynamics in international markets, political and legal environmental constraints, educational and economic constraints, international marketing research, international marketing institutions, and marketing practices abroad. <i>Prereq.</i> MKT 1331 and middler standing.	4 QH		
MKT 1891 Honors Thesis in Progress	0 QH		
MKT 1892 Honors Thesis	8 QH		
MKT 1893 Honors Thesis in Progress	0 QH		
MKT 1894 Honors Thesis	12 QH		
Logistics and Transportation			
TRN 1333 The Domestic Transportation System Examines the structure, operations, and problems of the several modes of transportation, and outlines the government role in regulation and promotion. Also highlights the interaction between carriers and shippers in the transportation marketplace.	4 QH		
TRN 1335 Current Issues in Logistics and Transportation Identifies important contemporary issues and problems in logistics and transportation and examines their nature and significance. Explores alternative approaches to resolving such problems by analyzing various options and their implications.	4 QH		
TRN 1344 Business Logistics Analyzes the role and activities of those involved in corporate logistics decision making. Emphasizes the importance of transportation planning, inventory control, warehousing, customer service standards, and location decisions in the design and operation of distribution systems.	4 QH		
TRN 1353 Seminar in Transportation and Logistics Focuses on a limited number of advanced transportation/logistics topics. Offers students experience with business and government	4 QH		
TRN 1514 Carrier Management Examines the perspective of those involved in managing the several modes of transportation. Emphasizes the decision-making process related to such issues as carrier financing, pricing, labor relations, and equipment selection.	4 QH		
TRN 1528 Urban Transportation Focuses on the movement of people and freight in and around metropolitan areas. Examines the role of transit managers in planning, implementing, and operating mass transit systems. Also outlines how various governmental units participate in financing and regulating urban transportation.	4 QH		
TRN 1591 Independent Study Allows the student who has received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study will take place. A copy of the final report prepared by the student will be presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from area coordinators.	1 QH		
TRN 1592 Independent Study Same as TRN 1591.	2 QH		
TRN 1593 Independent Study Same as TRN 1591.	3 QH		
TRN 1594, TRN 1595, TRN 1596, TRN 1597 Independent Study Same as TRN 1591.	4 QH each		
TRN 1721 Labor/Management Issues in Transportation Focuses on labor in the transportation industries. Examines trends in employee compensation, productivity, bargaining patterns, and influence of government policies on labor/management issues.	4 QH		
TRN 1760 International Transportation and Logistics Management Analyzes the managerial activities of logistics planning and operations in multinational firms. Focuses on contemporary issues that affect the design of international logistics systems, and examines the current and future status of ocean and air transportation in international trade and development.	4 QH		
TRN 1891 Honors Thesis in Progress	0 QH		
TRN 1892 Honors Thesis	8 QH		
TRN 1893 Honors Thesis in Progress	0 QH		
TRN 1894 Honors Thesis	12 QH		

Computer Science

COM 1100 Fundamentals of Computer Science*

4 QH

Introduces computers and computer programming. Studies basic concepts of a high-level language such as data types, variables, assignment, expressions, statements, and input/output. Surveys structured programming tools including flow control constructs, procedures and functions, parameters, local variables, and user-defined data structures. Discusses the string and array data structures in detail. Introduces graphics and animation. Emphasizes the systematic design of programs using structured components.

COM 1101 Algorithms and Data Structures I

4 QH

Introduces algorithms, data structures, abstraction, and modularization. Discusses elementary sorting and searching. Studies data structures such as records and combinations of arrays and records, external text and binary files, linked lists, stacks and queues. Introduces recursion as a technique for the rapid design of complex algorithms. *Prereq.* COM 1100, COM 1108 or equiv.

COM 1102 Functional Programming and Its Applications

4 QH

Introduces the fundamental concepts and applications of functional programming and their relationship to computer science. Reviews basic ideas underlying symbolic information processing and the role of LISP in this context. Covers applications selected from artificial intelligence, programming language design and implementation, procedural and data abstraction, and development of data-driven programs. *Prereq.* COM 1101.

COM 1105 Computer Science and Its Applications

4 QH

Provides an opportunity for students of all majors to understand and experience the computer science field and to become informed and intelligent users of its tools. Explores using the computer as a fundamental component of the problem solving process. Discusses the basic principles as well as relevant historical, social, cultural, and ethical issues. Provides hands-on experiences with applications such as word processors, spreadsheets, database management systems, Hypercard, graphics-statistics packages, and simulations. *Not open to computer science majors.*

COM 1107 Introduction to Programming I

4QH

Discusses important themes and ideas in computer science and introduces students to writing computer programs. Utilizes simple computer graphics in addition to text input-output. Examines variables, assignment, and flow control with loops and decisions. Explores algorithms, program design, and problem solving using procedures and functions.

COM 1108 Introduction to Programming 2

4QH

Continues discussing important themes and ideas in computer science. Examines data structures in programming, including arrays, string, user-defined data types, records, combinations of arrays and records, text-file input-output, and simple sorting methods. Focuses on a systematic approach to problem solving and program design through appropriate abstractions. Emphasizes visualizing concepts through computer graphics. *Prereq.* COM 1107.

*Students should take either COM 1100 or the pair of courses COM 1107 and COM 1108. Additional concepts and examples are introduced in COM 1107 and COM 1108, and the pace is somewhat slower than that in COM 1100.

COM 1110 FORTRAN Laboratory

1 QH

Considers elements of FORTRAN programming for those familiar with a high-level language such as Pascal or C. Includes input/output, subroutine linkage, and methods of structured programming in FORTRAN. *Prereq.* COM 1100.

COM 1114 C Laboratory

1 QH

Examines elements of C programming for those familiar with a high-level language such as Pascal and with elementary data structures. Emphasizes how C combines tools for structured programming with mechanisms for producing efficient code. Introduces UNIX. *Prereq.* COM 1101.

COM 1115 Introduction to Computers I

1QH

Introduces students to personal computers and how they can enhance productivity. Discusses the basic operations and style of interaction on Macintosh and MS-DOS computers. Teaches word processing in both environments. Introduces drawing and painting programs for creating presentation graphics. *Students may take either COM 1105 or the sequence COM 1115, COM 1116, and COM 1117, but not both. Not open to computer science majors.*

COM 1116 Introduction to Computers 2

1QH

Discusses using spreadsheets for data analysis. Describes how to create charts and graphs for data presentation. Introduces simple data management tasks and elementary programming via Hypercard. *Prereq.* COM 1115 or equiv. *Students may take either COM 1105 or the sequence COM 1115, COM 1116, and COM 1117, but not both. Not open to computer science majors.*

COM 1117 Introduction to Computers 3

1 QH

Discusses the design and use of relational databases for sophisticated data management tasks. Utilizes packages for statistical and graphic analysis of data. Introduces computer simulation. *Prereq.* COM 1115 and COM 1116 or equiv. *Students may take either COM 1105 or the sequence COM 1115, COM 1116, and COM 1117, but not both. Not open to computer science majors.*

COM 1121 Computer Science Overview I

1 QH

Reviews and gives practice to the intellectual skills needed for success as a computer science major. Discusses issues that can affect academic success and introduces the intellectual and cultural opportunities at Northeastern University and in Boston. Includes readings about major figures in computing and guest lectures that survey advanced fields in computer science. Looks ahead to professional work in computer science. *Prereq.* Computer science major.

COM 1122 Computer Science Overview 2

1 QH

Continues COM 1121.

COM 1130 Computer Organization and Programming I

4 QH

Introduces computer organization and programming at the assembly-language level. Topics include arithmetic instructions, memory organization and data representation, addressing modes, flow control instructions, subroutines, procedures and linkage with higher-level languages, run-time stack structure, implementation of recursion, floating point and bit instructions, terminal I/O using system services or higher-level languages, and use of the debugger. *Prereq.* COM 1101.

COM 1201 Algorithms and Data Structures 2**4 QH**

Introduces complex data structures and the corresponding algorithms for manipulation. Examines trees; binary search; priority queues, heaps, and heapsort; and quicksort. Introduces analysis of algorithms. Surveys graphs; depth-first and breadth-first search; shortest path and minimal spanning tree; sets, union, and find; hashing; and balanced trees. *Prereq.* COM 1101 and MTH 1137.

COM 1204 Object-Oriented Design**4 QH**

Introduces the philosophy and methodology of object-oriented design utilizing a modern, full-featured, object-oriented programming language. Considers the concepts of class, instance, data member, and method. Organizes classes into hierarchies, uses class inheritance to efficiently create a variety of related classes, and develops class libraries as the foundation for systematic software design. Applies object-oriented design to small and medium scale projects and compares object-oriented methods to other paradigms of software design. *Prereq.* COM 1101 and COM 1114, or permission of the instructor.

COM 1205 Software Design and Development**4 QH**

Presents the latest ideas and techniques in software methodology and provides a means for students to apply these techniques. Students, working in groups, will be expected to design, implement, test, and document a large software project. *Prereq.* COM 1201.

COM 1315 Database Design**4 QH**

Focuses on designing a database for use in a relational database management system. Uses the entity-relationship model and normalization on example problems. Presents the SQL language. Topics may include the network model, the hierarchical model, or the object-oriented model. Nonmajors with programming experience in PASCAL or C are welcome. Requires implementing a database schema and short application program on a commercial database management system. *Prereq.* COM 1101 or programming experience in a high-level language.

COM 1317 Transaction Processing Systems**4QH**

Focuses on the concepts and practice of modern transaction processing systems in a distributed setting. Describes the overall architecture of systems such as TP monitor, recovery manager, log manager, and lock manager. Discusses the principles of DO/UNDO/REDO logging such as the write-ahead log rule and the force log-on-commit rule. Describes compensation log records, checkpoint and restart recovery procedures, two-phase commit, lock tables, granularity of locking, and two-phase locking. *Prereq.* COM 1310 and COM 1315.

COM 1330 Operating Systems Concepts**4 QH**

Introduces basic structure, components, design, implementation, and internal operation of the kernel of computer operating systems. Surveys operating systems history, Input/Output device management, process environment, CPU scheduling, concurrent processes and synchronization, interprocess communication mechanisms, memory management, and device drivers. Uses examples from many operating systems (MS-DOS, UNIX) to reinforce concepts. Includes a lab to expose students to the system concepts through programming exercises. *Prereq.* COM 1140 and COM 1130, or equiv.

COM 1335 Operating Systems Design**4 QH**

Continues COM 1330. Discusses components needed to create commercial operating systems. Covers security and access control, resource allocation, deadlock management and resolution,

file system structures, and distributed operating systems. Offers examples from many operating systems (UNIX, VMS) to reinforce concepts. Requires programming and modifying operating system components through labs. *Prereq.* COM 1330.

COM 1337 Computer Communication Networks**4 QH**

Explores data networking. Focuses on concepts, technology, and implementation issues. Discusses distributed system requirements, network architectures, OSI model, communication protocols, routing algorithms, local area networks, public data networks, vendor network architecture, PC networks, standards, internetworking, network management, and performance issues. Uses examples from real networks (such as IBM, SNA, DEC's DECnet, Ethernet, Token Ring, and X.25) to reinforce theory. Requires using real networks and designing and implementing communication protocols. *Prereq.* COM 1330.

COM 1350 Automata and Formal Languages**4 QH**

Covers finite-state machines and regular expressions; context-free grammars; properties and decidability problems of regular and context-free languages; pushdown automata; pumping theorems for regular and context-free languages; and Turing machines, Church's thesis, and the halting problem. *Prereq.* COM 1201 and MTH 1137.

COM 1355 Compiler Design I**4 QH**

Implements concepts such as finite state automata, regular expression pattern matching, and contextfree grammars using a lexical analyzer and a compiler-compiler. Emphasizes LALR(1) or LL(1) parsing with exposure to top-down, bottom-up, and operator precedence methods. Examines ambiguous grammars and may include some code generation. Uses a "hands-on" approach, including either a sequence of programming assignments or a project. *Prereq.* COM 1131 and COM 1350.

COM 1358 Analysis of Programming Languages**4 QH**

Covers run-time behavior of programming languages; interpreters; static and dynamic scoping; parameter-passing mechanism; implementation of functions and recursion; and features of current languages and their implementation. *Prereq.* COM 1102.

COM 1370 Computer Graphics**4 QH**

Focuses on characteristics and programming of graphics output devices. Presents basics point and line drawing, two-dimensional displays, and clipping and windowing. Surveys pictures: data structures and display file organization; and interaction: graphical input and external events-operating system considerations. Includes some three-dimensional drawing. *Prereq.* COM 1201 and MTH 1301.

COM 1390 Algorithms**4 QH**

Introduces the basic principles and techniques of analyzing algorithms. Topics include algorithms on sorting, searching, graphs, and digraphs (such as minimal spanning tree, shortest path, depth-first search, components of a graph); and methods involving string matching, polynomials and matrices. Considers fast Fourier transform and the concept of N P-complete problems. *Prereq.* COM 1201, MTH 1125, MTH 1137, and MTH 1301.

COM 1400 Data Parallel Computing**4 QH**

Introduces the basic concepts of parallel computer architectures, network topologies, and data parallel programming. Emphasizes SIMD machines with mesh or hypercube interconnection networks. Studies fundamental data structures and data parallel

algorithms for matrix operations, fast fourier transforms, and graph and geometric computations for complexity and performance characteristics. Requires a significant amount of programming to complete course assignments.

COM 1410 Artificial Intelligence **4 QH**

Focuses on analysis of current computer algorithms dealing with problems such as theorem proving, chess playing, general problem solvers, robotics, symbolic computation, perceptions, and self-reproducing automated parallel machines. *Prereq.* COM 1102, COM 1201, and MTH 1409.

COM 1420 Principles and Methods in Interactive Systems Design **4 QH**

Introduces principles of computer-human interface (software) design, and methodologies of implementation, evaluation, and research in computer-human interaction. Topics include user psychology, dialog styles (menu interfaces, command languages, icons, windows), screen layout and design, input and output devices (mouse, touchscreen, keyboard, voice technology), error handling/reporting and system response time, user documentation, and "intelligent" interfaces. Traces techniques for implementing software-human interfaces, and methodologies for testing and assessing the "usability" of interactive systems.

COM 1600 Computer Science Project **4 QH**

Presents the latest ideas and techniques in software methodology and provides a means for students to apply these techniques. Students, working in groups, will be expected to design, implement, test, and document a large software project. *Prereq.* COM 1102, COM 1110, COM 1201, and COM 1355.

COM 1621 Computer Science Seminar **1 QH**

Presents a current topic or problem in computer science by an expert in the subject matter, in meetings held once or twice per week. Students are assigned additional questions and/or problems to research in the topic area as an aid to developing a deeper appreciation and understanding of various aspects of computer science. A capstone course for computer science majors. *Prereq.* Computer science seniors only.

COM 1700, COM 1701, COM 1702, COM 1720, COM 1730 **4 QH each**

Offers a special section for honors students in COM 1100, COM 1101, COM 1102, COM 1201, and COM 1130, respectively. *Prereq.* Enrollment in the Honors Program or permission of the instructor.

COM 1705, COM 1717, COM 1737, COM 1757 **5 QH each**

Offers a special section for honors students in COM 1205, COM 1316, COM 1335, and COM 1350 respectively. *Prereq.* Enrollment in the Honors Program or permission of the instructor.

COM 1770 Computer Science Seminar (Honors) **4 QH**

Offers a capstone course for computer science honors students. Exposes students to a variety of computer science topics of current interest, and provides an opportunity to improve skills in presenting technical material. Requires students to prepare a one hour presentation of professional quality on a topic of interest in computer science. Requires the student to write paper on the same topic.

COM 1777 Honors Adjunct Computer Science **1 QH**

Allows honors students who do not have an honors section to do honors work in one of the computer science elective courses while enrolled in the regular course.

COM 1800 Directed Study in Computer Science **4 QH**

Provides students strong in computer science and related sciences a chance to develop the art and skill needed to work independently and creatively in computer science. Programs of directed study, held one or more quarters, are available for highly motivated students who wish to explore in depth special topics in computer science. Directed study can be used as an opportunity to examine familiar material in fresh ways or to explore new material that is not offered in formal courses. *Prereq.* Permission of the instructor; may be repeated for credit.

COM 1810 Topics in Computer Science **4 QH**

Focuses on an advanced topic in computer science to be selected by the instructor. *Prereq.* Permission of the instructor.

Cooperative Education

COP 1135 Professional Development for Journalists

1 QH

Provides current career information in the field of journalism primarily through outside speakers. Prepares journalism students for field experience. Employs current preferred learning and working style models for self exploration.

COP 1180 Career Decision-Making

4 QH

Focuses on needs and concerns of students who may be undecided or uncertain about their academic major or career direction.

Addresses the needs of the group, as well as individual participants, and emphasizes self-assessment, career exploration, decision making, and goal setting. *Prereq.* Freshmen or sophomores in any major or permission of instructor.

COP 1220 Working in the United States

4 QH

Helps international students in their freshman through middler years compete more effectively for cooperative education positions in the United States and assists them in their cultural transition into the American work force. Considers work-oriented cross-cultural issues, the American work ethic, skills development, resume writing, and interviewing techniques. *Prereq.*

International students in first or second year in the United States, or permission of instructors.

COP 1314 Life/Career Planning

4 QH

Focuses on career exploration, self-assessment, job-search techniques, and networking. Requires students to prepare a professional resume, to participate in videotaped mock interviews, to research careers, and to investigate graduate and professional schools. *Prereq.* Junior or senior standing or permission of instructor.

COP 1353 Professional Development for Education

1 QH

Examines career management issues for fourth-year students.

Discusses work and personal values, current issues in the employment market, planning for graduate study, organizing and conducting a job search, advanced resume preparation, and interviewing techniques.

Criminal Justice

CJ 1101 Administration of Criminal Justice

4 QH

Surveys the contemporary criminal justice system from the initial contact with the offender through prosecution, disposition, incarceration, and release to the community. Emphasizes major systems of social control: police, corrections, juvenile justice, mental health systems, and their policies and practices relative to the offender. Maintains balanced study by providing legal, empirical, and sociological materials.

CJ 1112 Critical Issues in Criminal Justice

4 QH

Introduces students to the major issues and ethical considerations facing criminal justice and criminology today. Discusses six to eight major critical, moral, and ethical issues. Considers such core topics as the death penalty, abortion, euthanasia, abolition of the insanity plea, victimless crimes (prostitution, drug abuse, gambling), and gun control. Presents these issues in the format of pros and cons; involves student presentations or debates.

CJ 1151 Introduction to Law and the Legal Process 1

4 QH

Provides an introduction to the law and the legal system of the United States. Sets forth the fundamentals of our legal process and provides a summary description of both the private and public law system. Presents an overview of the traditional structure, as well as the basic principles of law.

CJ 1152 Introduction to Law and the Legal Process 2

4 QH

Continues the material presented in CJ 1151. Introduces basic tort and contract principles, administrative law, and governmental regulation of business, topics of particular concern to criminal justice professionals in both the public and private sectors, as well as to those students concentrating in legal studies. *Prereq.* CJ 1151 and CJ 1252.

CJ 1201 Criminology

4 QH

Introduces the major theories of crime causation developed over the past two centuries. Explores the scope and nature of the current crime problem in the United States. Examines the characteristics of specific criminal behavior such as violent crime, property crime, organized crime, white-collar crime, and public order crime.

CJ 1251 Introduction to Criminal Law

4 QH

Deals with the area of criminal responsibility, some of its limitations, and certain modifications substantially affecting it. Requires an ability to express in writing both the knowledge of a particular concept and the ability to identify it in a complex fact pattern and discuss its implications and ramifications.

CJ 1252 Criminal Due Process

4 QH

Focuses on a historical evaluation of the Fourteenth Amendment and its use in making rights prescribed under the Bill of Rights applicable to the individual states. Also details the inherent problems of the Fifth and Sixth Amendments, including the effect of their implications on such matters as police practices, illegal search and seizure, and right to counsel. Expects students to be familiar with basic concepts as well as changing interpretations so they can cite cases that may stand as precedents for conclusions they draw. *Prereq.* CJ 1251.

CJ 1253 Introduction to Criminal Courts

4 QH

Examines the role of criminal courts in the United States, the structure and organization of the court system, and the flow of cases from arrest to conviction. Focuses on the key actors in the

courtroom—prosecutors, defense attorneys, judges, and court clerks—and the decision-making processes in charging, setting bail, pleading guilty, going to trial, and sentencing. Addresses prospects for reforming courts. *Prereq.* CJ 1251 and CJ 1252.

CJ 1254 Civil Liability in Criminal Justice

4 QH

Studies the contemporary problems of civil liability affecting the criminal justice professional. Reviews cases involving police, security, probation, parole, and corrections personnel to help students understand and appreciate the legal factors, public policy issues, and methods of reducing the risk of civil liability. *Prereq.* CJ 1251 and CJ 1252.

CJ 1255 Introduction to Juvenile Law

4 QH

Introduces the way society responds to juvenile offenders. Topics studied may include important legislation, fundamental case law, behavioral research studies, philosophy, history, delinquency, abuse and neglect, transfers and waivers, status offenses, and comparative law. Students may be required to observe actual juvenile cases in the Massachusetts Juvenile Court. *Prereq.* HCJ 1252 and Junior or Senior only.

CJ 1301 Introduction to Security

4 QH

Examines the organization and administration of security and loss prevention programs in industry, business, and government. Emphasizes the protection of assets, personnel, and facilities and focuses on the relations between security organizations and government agencies.

CJ 1311 White-Collar Crime

4 QH

Gives the student a basic understanding of white-collar crime. Covers such topics as the nature and extent of white-collar crime, the social-psychologic makeup of white-collar crime, typologies, current efforts directed toward controlling it, and the interagency and jurisdictional problems and the benefits of cooperation.

CJ 1314 Security Management and Supervision

4 QH

Deals with the roles and responsibilities of the security manager. Gives special attention to the responsibilities of planning, organizing, staffing, directing, controlling, representing, and innovating. Explores the manager's responsibility in professionalizing security and other relevant issues. *Prereq.* CJ 1301 or equiv.

CJ 1318 Terrorism

4 QH

Attempts to give the student an understanding of what terrorism is and why it has become so popular. Includes the role of news media, political consequences of terrorism, the military as a resource, and the role of the hostage.

CJ 1319 Legal Aspects of Security Management and Operations

4 QH

Provides a comprehensive examination of the legal environment and issues affecting security operations and management. Analyzes elements of criminal, civil, property, regulatory, and business law from the perspective of organizational security management concerns. Includes legal basis of security practices, civil liability, corporate security, investigations, labor law, industrial espionage, governmental security issues, and other relevant topics.

CJ 1401 Policing a Democratic Society

4 QH

Gives an understanding of the role and function of policing in a modern democratic society. Examines contemporary American policing in light of its Anglo-Saxon roots, and compares it to polic-

ing in other Anglo-Saxon countries (such as Canada and Australia), and other modern police systems. Examines police in light of contemporary major issues including race, index crime, drugs, disorder, conflict, and riot. Examines the contemporary shift from reform (professional) to community and problem-oriented policing.

CJ 1411 Police Strategy 4 QH
Examines the current organizational strategy of American police, their goals and mission, and the resources and tactics they adopt to pursue those goals. Emphasizes the authority and resources granted to police; police function, organization, and administration; the demand for police services; the relationship of police to their environment; police tactics; and the outcome for which police strive. Focuses on police accountability and effectiveness. *Prereq. CJ 1401.*

CJ 1424 Seminar in Policing 4 QH
Specific topic in policing to be announced. *Prereq. CJ 1401, CJ 1411, and junior standing or above.*

CJ 1426 Topics in Policing 4 QH
Specific topic in policing to be announced. *Prereq. Junior standing or above.*

CJ 1427 Topics in Criminal Justice 4 QH
Specific topic in criminal justice to be announced. *Prereq. Junior or senior standing.*

CJ 1453 Criminal Justice Research Methods 4 QH
Examines basic concepts in conducting criminal justice research. Students will become familiar with research techniques that are necessary for systematic analysis of the criminal justice system, offenders' behavior, crime trends, program effectiveness, problem analysis, etc. Requires that students actively pursue such techniques as research interviewing, data coding, and preliminary analysis in and outside of class. *Prereq. MTH 1010 or equivalent.*

CJ 1454 Criminal Justice Statistics 4 QH
Focuses on the use of statistics with special emphasis on criminal justice applications and the analysis of criminal justice data. Covers basic descriptive statistics, including levels of measurement, measures of central tendency, and measures of variability. Introduces the student to inferential statistics, including the normal curve, sampling error and confidence intervals, hypothesis testing, chi-square, and correlation. *Prereq. HCJ 1453.*

CJ 1501 Evidence 1 4 QH
Provides students the opportunity to develop their understanding of the manner in which legal issues and disputes are resolved by trial. Focuses on the manner in which the trial system works and the reasoning behind the rules governing its operation, including rules of evidence: the mechanics of the adversary system, relevancy, reliability, and rules of exclusion based on policy considerations other than relevancy and reliability. Includes such learning tools as videotapes, mock trials, observation of actual court trials, lectures, take-home assignments, and exams. *Prereq. CJ 1251 and CJ 1252.*

CJ 1502 Evidence 2 4 QH
Continues with reliability and rules of exclusion, based on policy considerations other than relevancy and reliability, as set forth in CJ 1501. *Prereq. CJ 1501.*

CJ 1512 Seminar in Law and Criminal Justice 4 QH
Specific topic in the law and criminal justice to be announced. *Prereq. CJ 1251, CJ 1252, and junior or senior standing.*

CJ 1513 Criminal Homicide 4 QH
Surveys the topic of homicide. Explores general murder patterns and analyzes types of homicide emphasizing mass and serial killing. Discusses criminal justice issues in apprehension, prosecution, and punishment of murder.

CJ 1601 Survey of Correctional Systems 4 QH
Offers an introduction to penology and corrections. Explores the public reaction to convicted offenders historically, while concentrating on issues and programs of contemporary corrections. *Prereq. CJ 1201.*

CJ 1612 Juvenile Justice 4 QH
Gives an overview of the institutional response to the problems of juvenile delinquency, juvenile misconduct, and dependent/neglected and abused children. Emphasizes the police, court, and correctional agencies that process young people. In addition, devotes attention to an understanding of the history of the system, recent legal developments, and an assessment of current proposals for reform. *Prereq. SOC 1100 and CJ 1201.*

CJ 1613 Probation and Parole 4 QH
Examines the nature and problems of correctional field service, both adult and juvenile. *Prereq. CJ 1601.*

CJ 1615 Crime and Criminal Justice: A Comparative View 4 QH
Examines the problems of crime and its control from the vantage point of the comparative perspective. Analyzes countries such as Soviet Russia, China, France, East Germany, and West Germany. Also analyzes Great Britain, Holland, Finland, and Sweden in terms of their incidence and type of deviance and crime, as well as in terms of approach to social control and prevention of crime. Examines points of divergence between these countries and the United States in perceived causes of crime and differing approaches to rehabilitation and crime prevention. *Prereq. CJ 1101, SOC 1100, or equiv.*

CJ 1616 Women and the Criminal Justice System 4 QH
Introduces students to issues relating to roles taken by women involved with the criminal justice system and to the system's various responses to women in these roles. Focuses on women as victims of crime, as offenders, and as practitioners. *Prereq. Middler standing or above.*

CJ 1618 Victims of Crime 4 QH
Examines current theory and research regarding victims of crime. Devotes attention to concepts such as victim vulnerability and victim culpability. In addition, discusses the implications of a victim-oriented perspective for the administration of justice. Assesses current victim programs, including restitution, mediation, and compensation.

CJ 1621 Incarceration 4 QH
Offers in-depth familiarity with key reading in the history and sociology of incarceration. Topics include theories of incarceration; sentence determination; history of our incarceration systems; inmate and staff perspectives on incarceration; and special category inmates (mentally ill, rape victims, death row prisoners). Includes extensive discussion. *Prereq. CJ 1301, middler standing or above, and QPA over B-; or permission of instructor.*

CJ 1801, CJ 1802, CJ 1803, CJ 1804 Directed Study 4 QH each

Engineering

Chemical Engineering

The course descriptions listed under chemical engineering are intended to show the general scope of the subject that will be covered. Since courses are continually updated, specific topics or methods of approach may vary from term to term. In addition to meeting course prerequisites, students are expected to take each chemical engineering course in the sequence shown on the specimen program sheet.

CHE 1201 Chemical Engineering Calculations 1 4 QH

Examines the application of fundamental laws of mass and energy conservation to chemical and physical processes. Emphasizes material balances. A corequisite computational lab aids students in improving facility in handling problems typical of the course. Lab fee. *Prereq.* CHM 1132 and CHM 1138; CHE 1205 taken concurrently.

CHE 1202 Chemical Engineering Calculations 2 4 QH

Continues CHE 1201. Emphasizes energy balances and the simultaneous application of mass and energy conservation laws. Considers typical chemical processing industry problems. *Prereq.* CHE 1201.

CHE 1205 Computation Laboratory 2 QH

Offers lab sessions to aid students in problem formulation and solution. The assignments are based on material presented in CHE 1201. Emphasis is placed on computer software applications. Lab fee. *Prereq.* CHE 1201 taken concurrently.

CHE 1211 Chemical Engineering Thermodynamics 1 4 QH

Covers the first law and its application to batch and flow systems, heat effects in chemicals, and physical properties of real fluids. Applies basic principles and mathematical relations to the analysis and solution of engineering problems. *Prereq.* CHE 1201 and CHE 1205.

CHE 1310 Chemical Engineering Thermodynamics 2 4 QH

Covers thermodynamic properties of mixtures; fugacity and the fugacity coefficients from equations of state for gaseous mixtures; liquid phase fugacities and activity coefficients for liquid mixtures; phase equilibria; the equilibrium constant for homogeneous gas-phase reactions; and extension of theory to handle simultaneous, heterogeneous, and solution reactions. *Prereq.* CHE 1300.

CHE 1321 Momentum Transport 5 QH

Covers topics such as physical properties of fluids, pipe flow for process application, fluid metering, macroscopic balances and their application, microscopic balances, and boundary layer and turbulent flow theory. *Prereq.* CHE 1211 and CHE 1300.

CHE 1415 Experimental Methods 1 5 QH

Presents a comprehensive approach to solving experimental chemical engineering problems. Requires students to design, conduct, and report on experimental work orally and in writing. Involves experiments in unit operations in process measurements, fluid metering, and heat exchangers. Includes lectures on the principles of laboratory safety and data handling techniques. Lab fee. *Prereq.* CHE 1321.

CHE 1416 Experimental Methods 2 5 QH

Continues CHE 1415, requiring more advanced experimentation and more extensive reports. Involves experiments in unit operations in distillation, evaporation, extraction, filtration, or separations. Requires oral and written communications. Lab fee. *Prereq.* CHE 1415.

CHE 1421 Chemical Engineering Kinetics 4 QH

Covers fundamental theories of the rate of chemical change in homogeneous reacting systems; integral and differential analysis of kinetic data; design of batch and continuous-flow chemical reactors; and an introduction to heterogeneous reactions and reactor design. *Prereq.* CHE 1310.

CHE 1431 Heat Transport 5 QH

Presents the fundamentals of heat transport. Covers the design of heat transfer equipment and estimation of heat transfer rates. Includes conduction, convection, condensation, and boiling, and covers heat exchangers, evaporators, and driers. *Prereq.* CHE 1321.

CHE 1441 Separation Processes 5 QH

Describes the principles utilized in the physical separation of chemical mixtures. Covers filtration, evaporation, extraction, and distillation. Introduces equilibrium stages as applied to the separation of binary mixtures by liquid-liquid extraction and by continuous distillation. *Prereq.* CHE 1431.

CHE 1450 Chemical Engineering Economics 4 QH

Introduces financial decision-making techniques as applied to problems of production, storage, transportation, and utilization of chemical resources to meet societal needs. *Prereq.* ECN 1115.

CHE 1501 Chemical Process Design 1 6 QH

Focuses on the design of a chemical process. Topics include computer simulation of steady-state processing conditions, selecting process operations, preparing flowsheets and stream tables, and evaluating the economics of a chemical process design. Explores a comprehensive chemical process design problem with a team approach. *Prereq.* CHE 1421 and CHE 1441.

CHE 1502 Chemical Process Design 2 6 QH

Continues CHE 1501. Requires each student to solve a comprehensive chemical process design problem. Includes topics such as heat and power integration in chemical processing, design and scheduling of batch processes, sequencing separation operations, and safety considerations in process design. *Prereq.* CHE 1501.

CHE 1503 Projects 1 6 QH

Offers individual research related to some phase of chemical engineering. Open only to students selected by the department head on the basis of scholarship and proven ability. Lab fee. *Prereq.* Senior standing and consent of department.

CHE 1504 Projects 2 6 QH

Continues the research work begun in CHE 1503. Lab fee. *Prereq.* CHE 1503.

CHE 1511 Mathematical Methods in Chemical Engineering 4 QH

Examines the formulation and solution of problems taken from chemical and engineering studies that require advanced

mathematical methods. Emphasizes the formulation step, and discusses numeric and analytic solution techniques for solving sets of algebraic equations and for solving ordinary and partial differential equations. *Prereq.* Senior standing.

CHE 1512 Chemical Process Control 4 QH

Covers the Laplace transform and its use in solving ordinary differential equations; modeling and computer simulation of basic heat, mass, and fluid-flow dynamics; linearization of nonlinear systems; the transfer function; sensors, transmitters, valves, and controllers; block-diagram algebra; dynamics of higher-order systems; modeling and simulation of control-loop dynamics; frequency response; and Laplace and frequency domain stability analysis. *Prereq.* Senior standing.

CHE 1513 Introduction to Optimization 4 QH

Demonstrates elementary optimization techniques, such as gradient methods, pattern search, linear programming, and dynamic programming, as applied to a variety of elementary physical and chemical problems. *Prereq.* Senior standing.

CHE 1514 Special Topics 4 QH

Presents chemical engineering topics of interest to the staff member conducting the class. *Prereq.* Senior standing.

CHE 1516 Mass Transfer Operations 4 QH

Focuses on the mass transfer operations of crystallization, adsorption, chromatography, ion exchange, and membrane separations. *Prereq.* Senior standing.

CHE 1519 Polymer Science 4 QH

Introduces polymers and polymer chemistry, synthesis and reactions of polymers, and thermodynamics and kinetics of polymerization. Includes topics such as physical characterization of polymers; molecular structure, properties, and applications of polymers; and polymer processing and testing of polymers. *Prereq.* CHE 1421 and CHM 1272.

CHE 1520 Pollution Control in Chemical Industries 4 QH

Studies fundamental operations for handling environmental problems in the chemical process industries. Discusses water quality requirements and industrial waste characteristics. *Prereq.* Senior standing.

CHE 1521 Chemical Process Development 4 QH

Traces the manner in which a chemical process evolves from the research lab to full-scale production using typical processes as illustrations. Topics covered include economic factors, safety factors, batch vs. continuous operation, process evaluation, developing the flow sheet, and scale-up considerations. *Prereq.* Senior standing.

CHE 1523 Catalysis 4 QH

Introduces heterogeneous catalytic processes. Topics include mechanistic explanations, modeling of catalyzed reactions, and the application of catalysts to industrial practice. *Prereq.* Senior standing.

CHE 1524 Chemical Process Safety 4 QH

Introduces students to important technical fundamentals as applied to chemical process safety. Demonstrates good chemical process safety practice through chemical plant trips, visiting experts, and video presentations. *Prereq.* Senior standing.

CHE 1530 Biochemical Engineering Fundamentals 4 QH

Presents key concepts in biochemistry, cell biology, enzyme kinetics, and metabolic pathways, offered as an introductory exposure to these topics and not as complete coverage of life science fundamentals. Topics include biological reactor kinetics and design, transport phenomena in bioprocess systems, and process instrumentation/control. *Prereq.* Senior standing.

CHE 1777 Honors Adjunct 1 QH

To be added to any 4 QH course in the department when approved by the Honors Committee of The College of Engineering. Once approved, the adjunct information is forwarded to the Honors Office for dissemination to the honors membership. Students may enroll in CHE 1777 an unlimited number of times as it can be adjunct to any chemical engineering course.

CHE 1796 Honors Project 1 4 QH

Provides an opportunity for students to formulate and execute an analytical or experimental project under the guidance of a faculty member. Open only to students in the honors program. *Prereq.* Permission of department.

CHE 1797 Honors Project 2 4 QH

Continues CHE 1796. *Prereq.* CHE 1796.

Civil Engineering

CIV 1210 Structural Mechanics 1 4 QH

Covers statics of particles and rigid bodies in two and three dimensions; analysis of internal forces in trusses and beams; centroids and centers of gravity of lines, area, and volumes; and moments of inertia of areas and masses. *Prereq.* MTH 1223 taken concurrently and PHY 1222.

CIV 1211 Structural Mechanics 2 4 QH

Surveys analysis of stress and strain; mechanical properties of materials; elastic analysis of stresses and deformations of members subject to axial load, torsion, shear, and moment. Introduces column behavior. *Prereq.* CIV 1210.

CIV 1220 Structural Analysis 1 4 QH

Reviews reactions, shear and bending moment diagrams, bar forces in trusses, deflections by virtual work, and moment area methods. Analyzes indeterminate structures by consistent deformations, slope deflection, and moment distribution. *Prereq.* CIV 1211.

CIV 1222 Structural Analysis 2 4 QH

Focuses on matrix analysis of indeterminate structures using both flexibility and stiffness approaches. Examines computer applications to analysis of framed structures. *Prereq.* CIV 1220.

CIV 1226 Structural Analysis and Design Laboratory 2 QH

Uses lectures, experimental studies, computation labs, and computer projects to develop students' knowledge of structural behavior and understanding of the design and analysis of structures. *Prereq.* CIV 1220 taken concurrently.

CIV 1240 Concrete Design 4 QH

Reviews mechanical properties of steel and concrete. Studies behavior and design of reinforced concrete beams for shear,

moment; and bond; and design of stocky columns for axial load and moment. Emphasizes strength design. *Prereq.* CIV 1220.

CIV 1245 Advanced Structural Design 4 QH

Continues concrete and steel design. Topics in concrete design include columns with axial loads and bending moments, biaxial bending, and slenderness effects; footings to support walls and columns; prestressed concrete fundamentals. Topics in steel design include bolted and welded connections with tension, shear, combined tension and shear, and eccentric shear; framed beam connections; beam-to-column moment connections; composite columns with combined bending and axial load; composite beams with full and partial composite action. *Prereq.* CIV 1240 and CIV 1250.

CIV 1250 Steel Design 4 QH

Focuses on design of steel members subject to tension, compression, bending, and combinations of loading; and design of connections, braced frames, and rigid frames. *Prereq.* CIV 1220.

CIV 1295 Structural Design Projects 4 QH

Capstone structural design course. Consists of a minimum of two projects that consider environmental, social, and economic impact. Discusses the safety requirements of various government agencies. Projects require identification of design loading, assessment of structural stability, material usage, and the reliability of the proposed design. Employs computer-aided designs and verifies the results by approximate methods. Considers and analyzes economics of alternative designs. *Prereq.* CIV 1245 taken concurrently, CIV 1222, and senior standing.

CIV 1310 Fluid Mechanics 4 QH

Introduces both the statics and dynamics of fluid mechanics. Topics include properties of fluids; pressure variation in water and air; pressure force on surfaces and submerged bodies, continuity, momentum, and energy principles; dimensional analysis and hydraulic similitude; flow in closed conduits, frictional and local losses in pipes and systems; and problems in steady flow. *Prereq.* CIV 1210.

CIV 1320 Hydraulic Engineering 4 QH

Covers a variety of topics including pipe networks; water hammer; pumps and pump selection; pipe-pump combinations; flow in open channels, uniform flow, gradually varied flow, and hydraulic jump; drag forces on bodies; principles of hydrology, unit hydrograph, and rainfall-runoff relationships; and some aspects of ground water and well hydraulics. *Prereq.* CIV 1310.

CIV 1340 Environmental Engineering I 4 QH

Focuses on protection and management of the environment. Topics include assessment of environmental quality; introduction to water and wastewater technology; air pollution control; and solid waste management. *Prereq.* CHM 1132.

CIV 1341 Environmental Engineering 2 4 QH

Concentrates on development of fundamental physical, chemical, and biological phenomena of water and wastewater systems with engineering applications in water technology from source to ultimate disposal. *Prereq.* CIV 1310 and CIV 1340.

CIV 1350 Environmental and Hydraulics Laboratory 4 QH

Presents lectures, labs, and field experiments in environmental and hydraulic engineering. Experiments in hydraulics include fluid properties; hydrostatics; drag forces; and flow in pipes,

channels, pumps, and turbines. Environmental experiments include physical, chemical, and biological analyses normally used by environmental engineers. Field experiments are coordinated to allow collection of environmental and hydraulic data concurrently. *Prereq.* CIV 1320 taken concurrently and CIV 1340.

CIV 1370 Air Pollution 4 QH

Focuses on theory and practice related to engineering management of air resources. Surveys microclimate and dispersion of pollutants; atmospheric chemistry; air pollution instrumentation; control of gaseous and particulate emissions; design of air pollution control systems; and biological and chemical aspects of air pollution with emphasis on the toxicological aspects of the environment. Other topics include the physiological effects of aerosols; analysis of organic and inorganic constituents of the atmosphere; and rationale for establishment of air quality criteria and standards. *Prereq.* senior standing.

CIV 1395 Environmental Design Projects 4 QH

Capstone design course in the field of environmental engineering. Up to six individual design projects are assigned, typically involving water and/or waste treatment, site development, industrial waste handling, chemical treatment, and the modification of existing facilities. Each is given a careful critique. Designs require input relating to environmental protection and impact, economic factors, engineering feasibility, selection from alternatives, and safety consideration. One project requires an oral presentation. *Prereq.* CIV 1320, CIV 1341, CIV 1350, and senior standing.

CIV 1410 Soil Mechanics 4 QH

Studies soil classification, soil-water phase relations, ground water seepage, consolidation theory, strength properties of soils, stress distributions in soils due to surface loads, and slope stability. *Prereq.* CIV 1211 and CIV 1310.

CIV 1411 Soil Mechanics Laboratory 2 QH

Focuses on lab exercises, including soil classification, seepage, shear strength, consolidation, and triaxial testing. *Prereq.* CIV 1410 taken concurrently.

CIV 1420 Foundation Engineering 4 QH

Topics include subsurface explorations, determination of soil-bearing capacity, design of shallow foundations, pile and caisson foundations, design of retaining walls, anchored bulkheads and braced sheeting, and other selected topics on foundation design and construction. *Prereq.* CIV 1410.

CIV 1430 Geotechnology 4 QH

Introduces the geological sciences as they apply to civil engineering practice. Focuses on the effects of significant geological features on location, design, construction, operation, and maintenance of engineering projects. *Prereq.* CIV 1410.

CIV 1495 Geotechnical Design Projects 4 QH

Capstone design course for those interested in the geotechnical area. Two or more projects involving the various aspects of analysis and design used in geotechnical practice. Requires evaluation of subsurface conditions, identification of critical issues, assessment of environmental impacts, economics, safety, construction sequencing, and construction feasibility. They may also include structural design. Examples include design of foundations for super-structures, temporary earth retaining systems for deep excavations, and permanent earth support walls for deep earthen cuts. *Prereq.* CIV 1420, CIV 1430, and senior standing.

CIV 1510 Materials**4 QH**

Focuses on the structural, chemical, and mechanical properties of materials of importance to civil engineers. Topics include fundamental nature of matter; significance of phase transformations; control of microstructure; and the mechanisms of failure of materials. *Prereq.* CHM 1132.

CIV 1511 Materials Laboratory**2 QH**

Uses standard tests and equipment in the lab to determine structural and mechanical properties of materials common to civil engineering practice: concrete, aggregates, steel, wood, asphalt, and others. *Prereq.* CIV 1510 taken concurrently.

CIV 1530 Transportation Analysis and Planning**4 QH**

Covers history and policy issues in urban transportation: characteristics of different urban transportation models; fundamentals of bus and rail transit operations planning; fundamentals of urban highway operation; transportation systems management; and land use and demand modeling. Other topics include environmental impact assessment, citizen participation, data collection, and transportation in developing countries. *Prereq.* Junior standing or above.

CIV 1540 Highway Engineering**4 QH**

Introduces highway engineering. Topics include administration, economic factors, planning, environmental impacts, geometric design, drainage, and the design of flexible pavements. *Prereq.* CIV 1410 and CIV 1620.

CIV 1550 Construction Management**4 QH**

Surveys the construction industry and tasks that must be addressed by construction management, including resource allocation, construction environment, organization, contracts, funding, cash flow, productivity, labor relations, network planning and scheduling, construction accounting, and project control. *Prereq.* Senior standing.

CIV 1595 Transportation Design Projects**4 QH**

Capstone design course in transportation. Involves planning/design of modified transportation facilities and services. Topics include demand estimation, highway design, traffic flow, safety, economic and social considerations, environmental impacts, and transit fleet size requirements. Examples of such projects are planning for a new highway, transportation systems management planning for an existing corridor, and design of an intermodal transfer facility. *Prereq.* CIV 1530, CIV 1540, CIV 1630 taken concurrently, CIV 1640, and senior standing.

CIV 1620 Engineering Measurements**4 QH**

Considers the mathematics and instrumentation used in land surveying for obtaining measurements of distance, elevation, and direction. Covers the methodology applied for traverses, areas, coordinate systems, horizontal and vertical curves, earthwork, and topographic mapping. *Prereq.* MTH 1124 and PHY 1222.

CIV 1621 Engineering Measurements Laboratory**2 QH**

Examines field problems illustrating and applying the lecture material in CIV 1620, with computer applications. *Prereq.* CIV 1620 taken concurrently.

CIV 1630 Civil Engineering Systems**4 QH**

Covers application of system synthesis and optimization techniques: calculus method, linear programming, network analysis, and dynamic programming. *Prereq.* MTH 1223.

CIV 1640 Applied Probability Theory for Civil Engineers**4 QH**

Covers applications of probability theory to civil engineering problems, probabilities of events, random variables and distributions, derived distributions, expectation, common probability models, and an introduction to statistics. *Prereq.* MTH 1223.

CIV 1650 Legal Aspects of Civil Engineering**4 QH**

Introduces business law for engineering organizations, including description and evaluation of various types of contracts for engineering services and construction, procedures for submitting bids, procedures for claims, and legal steps to minimize risk exposure, both in United States and international business. *Prereq.* Senior standing.

CIV 1665 Professional Issues for Civil Engineers**1 QH**

Focuses on concepts and theories of classical and contemporary ethics, moral development theories, and developing and applying professional ethics in engineering. Traces the development and philosophies of professional engineering societies. Covers the requirements and responsibilities of professional registration. *Prereq.* Junior standing.

CIV 1777 Honors Adjunct**1 QH**

To be added to any 4 QH course in the department when approved by the Honors Committee of the College of Engineering. Once approved, the adjunct information is forwarded to the honors office for dissemination to the honors membership. Students may enroll in CIV 1777 an unlimited number of times as it can be adjunct to any civil engineering course.

CIV 1796 Independent Study/Research 1 (Honors)**4 QH**

Involves an analytical or experimental project under the supervision of a department faculty member. Before the end of the first week of the quarter, each student must obtain written approval for a proposed project from the faculty supervisor and from the department. A formal report must be submitted to the faculty supervisor at the end of the quarter. *Prereq.* Junior or senior standing in the honors program.

CIV 1797 Independent Study/Research 2 (Honors)**4 QH**

Continues CIV 1796, or a new project following the guidelines of CIV 1796. *Prereq.* CIV 1796.

CIV 1810 Special Topic in Civil Engineering**4 QH**

This is a special course within the field of civil engineering initiated by the appropriate discipline committee and approved by the department. *Prereq.* Permission of instructor.

CIV 1820 Special Project in Civil Engineering**4 QH**

Offers individual study in an area within the field of civil engineering, selected by the student and his or her instructor with approval by the appropriate discipline committee, resulting in a definitive report and an oral presentation. *Prereq.* Outstanding academic performance.

Electrical Engineering

ECE 1171 Electrical Engineering 1**4 QH**

Introduces electric circuit theory. Covers Kirchhoff's laws, loop and nodal analysis, Thevenin's theorem, power and energy, exponential excitation, and the system function, introduction to digital electronics. *Prereq.* MTH 1125; not open to electrical engineering majors.

ECE 1178 Digital Electronics

Introduces electronic digital circuits. Covers Kirchhoff's Laws, single-time constant systems, semiconductors, MOS and bipolar transistor operation, and their application in basic logic-gate families. Also includes Karnaugh maps and gate arrays. *Not open to electrical engineering majors.*

ECE 1215 Circuits and Systems 1**4 QH**

Examines basic concepts of electric circuits including current, voltage, power, and energy. Covers Kirchhoff's and Ohm's laws, and analyzes electric circuits composed of resistors and controlled sources. Studies node and mesh analysis, network topology, graphs and trees, and selecting independent loop equations. Covers linearity and superposition, Thevenin and Norton theorems, and maximum power transfer. *Prereq. MTH 1125 and PHY 1223.*

ECE 1216 Circuits and Systems 2**4 QH**

Discusses inductors and capacitors, transient analysis by differential equations, the sinusoidal steady state, representation by complex exponentials, phasors, impedance and admittance, complex power and power factor, coupled coils and transformers, and three-phase circuits. *Prereq. ECE 1215 and MTH 1125.*

ECE 1217 Circuits and Systems 3**4 QH**

Covers complex frequency and generalized frequency response, phase and amplitude response, Bode diagrams, network functions and two-port approach, and treatment of signals in the frequency domain (Fourier series) and in the time domain (impulse response and convolution). Studies applying Laplace transform in circuit analysis. *Prereq. ECE 1216 and MTH 1225.*

ECE 1221 Measurements Laboratory**1 QH**

Covers fundamentals of electrical measurements and instrumentation. Topics include electrical characteristics of meter movement and its use in designing ammeters and voltmeters; sources of DC current and voltage and their characteristics; the oscilloscope and its application to the display of waveforms and I-V curves of the two-terminal devices; and the measurements of amplitude, phase, and time interval. Lab fee. *Prereq. ECE 1215 taken concurrently.*

ECE 1222 Circuits Laboratory 1**1 QH**

Offers experiments in basic circuits and measurement. Topics include AC waveforms and circuits for the measurement of peak, average, and rms values; network theorems, that is, Thevenin and Norton, their application and experimental verification; and null circuits such as the Wheatstone bridge and potentiometer. Discusses characterization of simple LTI circuits including RL, EC, and RLC by investigation of their step response and impulse response. Lab fee. *Prereq. ECE 1216 taken concurrently.*

ECE 1223 Circuits Laboratory 2**1 QH**

Offers experiments in controlled sources sinusoidal excitation of first order RC and second order RLC networks; the determination by measurement of magnitude and phase (Bode) plots; and investigation of the resonance phenomenon. Lab fee. *Prereq. ECE 1217 taken concurrently.*

ECE 1224 Electronics Laboratory 1**1 QH**

Follows from ECE 1346. Experiments include p-n junctions and diodes, regulation and power supplies, transistor biasing and bias stability, and MOS digital circuits. *Prereq. ECE 1346, and ECE 1347 taken concurrently.*

ECE 1225 Electronics Laboratory 2**1 QH**

Follows from ECE 1347. Experiments with designing and verifying basic analog circuit functions utilized in integrated circuits. Advantages inherent to ICs, such as component matching and tracking, are exploited in the circuit building blocks investigated. Studies output power stages, current sources, amplifying stages, and differential amplifiers. Topics include applications to signal amplification, D-to-A conversion, and the extraction of weak signals buried in interference. Lab fee. *Prereq. ECE 1347, and ECE 1349 taken concurrently.*

ECE 1226 Discrete Systems Laboratory**1 QH**

Utilizes a personal computer to study and explore various aspects of A/D and D/A conversion such as aliasing and quantization and some aspects of discrete Fourier transforms and digital filters. Lab fee. *Prereq. ECE 1333 taken concurrently.*

ECE 1227 Electromagnetic Fields Laboratory 1**1 QH**

Supports class material related to microwave transmission and radiation. Experiments include microwave transmission line measurements and the determination of the properties of dielectric materials; transmission line length measurement; reflection and impedance measurement of dipole antenna; frequency characteristics of antennas and waveguides; and mutual coupling and radiation pattern determination. Lab fee. *Prereq. ECE 1364 taken concurrently.*

ECE 1228 Electromagnetic Fields and Energy Conservation Laboratory 2**1 QH**

Presents static and quasi-static (low frequency) applications of electromagnetic fields and electromechanical energy conversion. Experiments in electromagnetic fields include measurement of static electric potentials in electrode structures and numerical solution of Laplace's equation and static magnetic field measurements of coil configurations. Experiments in energy conversion include transformers and induction motors. Investigates hysteresis, transformer and motional emfs, and development of electromagnetic torque. Lab fee. *Prereq. ECE 1365 taken concurrently.*

ECE 1229 Digital Systems Laboratory**1 QH**

Introduces some aspects of computer hardware design encountered at the digital logic level. Discusses both combinational logic and sequential logic units. Focuses on MSI devices including multiplexers, decoders, counters, shift registers, PROM, RAM, and ALU. Demonstrates the design of Mealy and Moore sequence detectors and other digital subsystems such as parallel binary divider. Lab fee. *Prereq. ECE 1382 taken concurrently.*

ECE 1230 VLSI System Design Laboratory**2 QH**

Examines the design, layout, and simulation of digital VLSI circuits using a comprehensive set of CAD tools. Studies layouts of NMOS and CMOS combinational and sequential circuits using either a layout editor or automatic layout generators. Studies functional structures including registers, adders, decoders, ROM, PLAs, counters, RAM, and ALU. Utilizes logic and circuit simulators for the logic verification and timing simulation of designed circuits. Lab fee. *Prereq. ECE 1351 taken concurrently.*

ECE 1231 Electric Power Laboratory 1**1 QH**

Presents a power systems design project encompassing one or more of the following computer studies: transmission line constants, power flow, short circuits, and transient stability. Uses a personal computer to upgrade the design of a small power system. Lab fee. *Prereq. ECE 1472 taken concurrently.*

ECE 1232 Electric Power Laboratory 2**2 QH**

Covers topics in electromechanical energy conversion employing the "Faraday Law machine" bench. Studies Faraday's Law, transformers, reluctance and induction motors, and synchronous machines. Lab fee. *Prereq.* ECE 1472, and ECE 1371 taken concurrently.

ECE 1233 Semiconductor Processing Laboratory**2 QH**

Covers fabrication and testing of simple MOS integrated circuits. Compares process and device models introduced in ECE 1406 with experimental results during weekly lab sessions. Processing includes oxidation, diffusion, lithography, etching, metallization, and characterization. Fabricated diodes, MOS capacitors and transistors, and simple gates will be electrically characterized. Lab fee. *Prereq.* ECE 1406 taken concurrently.

ECE 1234 Digital Signal Processing Laboratory**2 QH**

Focuses on programming a digital signal processing chip in its native assembly language, and performing input/output operations via A-to-D and D-to-A converters. Studies real time signal processing operations and hardware aspects of DSP systems. Considers applications to digital frequency synthesis, computation of discrete time convolution, speech scrambling through frequency inversion, and design and implementation of both FIR and IIR digital filters. Lab fee. *Prereq.* ECE 1456 taken concurrently.

ECE 1235 Control Systems Laboratory**1 QH**

Familiarizes the student with the practical aspects of control systems design through lab experiments. Topics include analog computer simulation, digital computer control, and use of a programmable controller. Experiments with PID control of DC motor and computer implementation of feedback compensations. Lab fee. *Prereq.* ECE 1420 taken concurrently.

ECE 1332 Linear Systems 1**4 QH**

Develops the basic theory of continuous linear systems. Discusses nonlinear no-memory systems, develops the time-domain theory of linear time-invariant systems with memory, analyzes convolution, causality, and stability in detail, and develops the bilateral Laplace transform to analyze time-invariant systems in the frequency domain. Discusses gain, phase-shift, and the stability of feedback systems. *Prereq.* ECE 1217 and MTH 1225.

ECE 1333 Linear Systems 2**4 QH**

Develops the basic theory of linear discrete systems. Discusses the representation of discrete signals and analyzes continuous waveform sampling and quantization. Develops the theory of shift-invariant, linear systems. Discusses FIR and IIR systems, recursive analysis, convolution, causality, and stability in detail. Develops the discrete Fourier transform and the Z-transform and then analyzes discrete signals and systems in the frequency domain. *Prereq.* ECE 1332, and ECE 1226 taken concurrently.

ECE 1346 Electronics 1**4 QH**

Emphasizes the use of solid-state active devices in digital circuits. Introduces binary values, logic operations, flip-flops, and registers from the viewpoint of symbolic logic gates, Boolean algebra and Karnaugh maps. Other topics include solid-state devices for the realization of logic functions; concepts of diodes; BJT and field-effect characteristics leading to the use of such devices in implementing inverters, NAND and NOR gates for T₁L, CMOS and NMOS logic families. *Prereq.* ECE 1216.

ECE 1347 Electronics 2**4 QH**

Emphasizes the use of transistors, including integrated devices in the design of analog circuits. Topics include biasing, linearized incremental model characteristics such as gain and impedance levels, early effect, use of signal flowgraphs and frequency response for single and compound stages, and an introduction to operational amplifiers. *Prereq.* ECE 1346, and ECE 1224 taken concurrently.

ECE 1349 Electronic Design 1**4 QH**

Studies the design of analog circuits with emphasis on operational amplifiers. Topics include concepts of feedback, open- and closed-loop gain, effect of feedback on impedance levels, frequency response, and stability and compensation in feedback systems. Introduces ECL from the viewpoint of feedback, followed by an analog/digital design example. *Prereq.* ECE 1347, and ECE 1225 taken concurrently.

ECE 1350 Electronic Design 2**4 QH**

Continues ECE 1349. Emphasizes the design of systems involving analog, digital and analog/digital approaches to signal acquisition and processing. *Prereq.* ECE 1349.

ECE 1351 Special Topics in IC Design**4 QH**

Offers a structured digital MOS design course in designing, verifying, and fabricating both NMOS and CMOS VLSI integrated circuits. Introduces required design rules and relates them to the fabrication process. Begins design exercises and tutorials with basic inverters and proceeds to the design, verification, and performance of large complex digital logic networks. Develops a simple RD delay model in conjunction with the theory of delays in VLSI systems. Other topics include program logic arrays and automatic design tools, shift registers, arithmetic logic units, and memory systems. *Prereq.* ECE 1382, and ECE 1230 taken concurrently.

ECE 1363 Electromagnetic Field Theory 1**4 QH**

Studies the major areas of statics, dynamics, quasi-statics, and material media starting with Maxwell's equations. Statics covers the study of the electrostatic and magnetostatic fields, including the scalar electric potential and vector magnetic potential. In dynamics, presents Faraday's law and Ampere's law for time-varying electromagnetic fields. Quasi-statics introduces the concept of electromechanical coupling with applications to elementary energy conversion, both electric and magnetic devices. Material media covers the macroscopic model of dielectric materials; the electric polarization and the electric flux density vector; macroscopic model of magnetic materials, magnetization, and magnetic field intensity; and boundary conditions. *Prereq.* MTH 1223, MTH 1225, and PHY 1224.

ECE 1364 Electromagnetic Field Theory 2**4 QH**

Introduces the applications of electromagnetic field theory. Based on Maxwell's equations for time-varying fields, develops the following areas: waves and energy, including plan wave propagation, waveguides and Poynting's theorem; radiation, with emphasis on spherical waves and elementary scattering and application to antenna design; distributed systems terms of waveguide circuit concepts, transmission lines, and Smith chart techniques. Presents other applications in the optics and acoustics areas. *Prereq.* ECE 1363, and ECE 1227 taken concurrently.

ECE 1365 Electromagnetic Fields and Energy Conversion**4 QH**

Focuses on the static and quasi-static solution of the electro-magnetic field equations and emphasizes energy conversion and transducers. Topics include magnetostatics; magnetic materials and transducers; and magnetic circuits, transformers, and energy conversion concepts applied to DC, synchronous, and induction machines. *Prereq.* ECE 1364, and ECE 1228 taken concurrently.

ECE 1371 Electrical Machines 1**4 QH**

Reviews electromagnetic field theory as applied to electro-mechanics. Discusses magnetic circuits, transformers, and their circuit representations; principles of electromechanical energy conversion (state-variable formulation of electromechanical coupling, singly and multiply excited magnetic-field systems; elementary concepts of rotating machines including transformer emf, speed emf, and torque production); steady-state theory and performance of basic rotating machines such as induction, synchronous, and DC commutator machines through circuit-model concepts. *Prereq.* ECE 1365, and ECE 1232 taken concurrently.

ECE 1372 Electrical Machines 2**4 QH**

Covers dynamic behavior of electromechanical devices; transient performance of synchronous machines; synchronous and induction-machine dynamics; and DC machine dynamics. *Prereq.* ECE 1371.

ECE 1379 Transients in Electric Power Systems**4 QH**

Introduces transient response in electrical power systems. Topics include lightning; switching; faults; and protection against transient overvoltages. Considers transmission lines, transformers, circuit breakers, surge arresters, and fuses in terms of transient response. *Prereq.* ECE 1333.

ECE 1381 Computer Engineering 1: Introduction to Computer Architecture**4 QH**

Presents a view of the architecture of a modern computer; the visible architecture provides the starting point. Uses assembly language programming to develop a foundation on the hardware which executes a program and shows what a compiler, assembler, and linker do and how they interact with the architecture. Explores data structures from a programmatic perspective (static storage, stack, and heap) and from a high-level language perspective (simple data types, and structured data types). Covers several types of computer number systems and arithmetic (2s-complement, IEEE floating point, and logical operations). Includes numerous programming exercises and a software design project to develop working facility with the tools and concepts that underlie the next three computer engineering courses. *Prereq.* GE 1100 or equiv.

ECE 1382 Computer Engineering 2: Design of Digital Logic Machines and Circuits**4 QH**

Continues ECE 1381 with a bottom-up view of the design of logic machines, leading to the design of a simple digital computer by the end of the quarter. Covers Boolean switching algebra and gate-count minimization; combinational design; sequential circuits; state machines; PLA, PAL, and ROM realizations; CPU design, design of the ALU, and control unit design. Introduces CAD logic design tools. Requires a design project using SSI and MSI chips to develop facility in the design and testing of functional digital circuits. Proof of the circuit will be done using the CAD tools. *Prereq.* ECE 1381, and ECE 1229 taken concurrently.

ECE 1383 Computer Engineering 3: Microprocessor-Based Design**4 QH**

Focuses on the hardware design for modern microprocessor systems. Topics include microprocessor systems architecture; HP64000 microprocessor development system; support circuits; microprocessor busses; electrical characteristics and buffering; memory systems, memory maps, and address decoding; timing in microprocessor systems; asynchronous and synchronous bus protocols; and troubleshooting microprocessor systems. Covers I/O-port design and interfacing using VLSI devices; parallel and serial ports; communication protocols and synchronisation to external devices; hardware and software handshake; serial communication protocols; and RS 232C, RS 422, and RS 423 serial interface standards. Investigates exception processing and interrupt handlers, interrupt generation, interfacing, and vectoring. Includes comprehensive lab exercises that let groups of three students build a modern microprocessor system and execute a small project that enhances the system with useful hardware or software. *Prereq.* ECE 1382.

ECE 1384 Computer Engineering 4: Hardware and Software for Microprocessor Interfaces**4 QH**

Focuses on the interaction of software and hardware necessary to interface microprocessor systems to the real world. Topics include special-purpose I/O devices; timers; D/A and A/D converters; DMA controllers, and disk controllers. Surveys bus design and bus protocols: VME bus, IEEE-488 (GPIB) instrument bus, small computer system interface (SCSI) bus. Analyzes real-time programming: I/O techniques, event-handling delays, and data throughput rates. Considers BIOS, monitors, simple operating systems, multitasking, and memory management. Most of the course is taught in the context of one modern microprocessor, but other microprocessors will also be discussed. Includes several lab exercises and a project implementing hardware and software for a complex microprocessor interface. *Prereq.* ECE 1383.

ECE 1385 Computer Engineering 5: Introduction to Robotics**4 QH**

Studies intelligent interactions between machines and their environment with emphasis on sensory (vision)-driven locomotion and manipulation. Examines integration of sensors, manipulators, and computers into intelligent robotic systems. Demonstrates vision, touch, force, position, proximity, and torque sensors and their role in adaptive control of robot movements. Other topics include computational needs of sensory data processing; VLSI implementation of data-driven architectures for low-level vision; image processing and understanding as a means of developing symbolic models of the visual (sensory) world; manipulator kinematics and dynamics; VLSI controllers for multicoordinate robotic systems; robotic software tools, including high-level language and decision-making functions; and real-time microprocessor networks and control hierarchies within the robot. *Prereq.* ECE 1333, ECE 1382, and ECE 1383.

ECE 1386 Computer Engineering 6: Structure of Large-Scale Computer Systems**4 QH**

Studies large-scale computer systems with applications to robotics, communications, artificial intelligence, and interactive computer design. Covers a global overview of distributed and parallel computing systems for problem solving, planning, and massive data processing. Examines special purpose processors that constitute such complex systems including parallel hardware for image processing, industrial data acquisition and control systems, array processors, and knowledge-based systems. *Prereq.* ECE 1384.

- ECE 1390 Senior Project Laboratory 1** 2 QH
Allows students to work with a faculty adviser on a term project, either experimental or theoretical. *Prereq.* *Permission of department.*
- ECE 1391 Senior Project Laboratory 2** 2 QH
Continues the project started in ECE 1390 or it may be a new project. *Prereq.* *Permission of department.*
- ECE 1400 Special Topics** 4 QH
Covers various topics from term to term depending on the interests of the department and the students. *Prereq.* *Permission of department.*
- ECE 1401 Selected Topics In Electronics** 4 QH
Covers the description and application of those electronic devices (thyristors, photodiodes) not covered in depth in the regular electronics sequence; electronic subsystems (AFC, shift registers); and systems (navigation systems, telephone switching systems). Most of the presentations are chosen and made by students, but there are also lectures by invited speakers by the instructor. *Prereq.* *ECE 1347.*
- ECE 1406 Integrated Circuit Fabrication** 4 QH
Surveys integrated circuit fabrication from crystal growth to chip interconnection and packaging. Discusses fabrication and device theory in the classroom, closely tying these to the concurrent fabricating and testing of MOS-integrated circuits in the laboratory (ECE 1233). Covers the major processes used in all integrated circuit fabrication including lithography, film deposition, diffusion, ion implantation, and silicon oxidation. Discusses the p-n junction diode, the diode equation, MOS capacitors and transistors, and VLSI fabrication processes (NMOS, CMOS, and bipolar). *Prereq.* *ECE 1347, and ECE 1233 taken concurrently.*
- ECE 1408 Physical Electronics** 4 QH
Develops elements of solid-state theory including wave mechanics, crystalline and amorphous solids, statistical mechanics, and electron transport theory to provide background for a thorough understanding of the junction diode. Explores ohmic contacts and Schottky barriers and the ways that these may be generated in individual and integrated form. Demonstrates how these elements are joined together to form BJTs and JFETs. *Prereq.* *ECE 1347.*
- ECE 1420 Control Systems** 4 QH
Comprises closely coupled lectures and laboratory experiments. Topics covered include control system concepts, basic components and goals, modeling and mathematical description, transfer function and state variable representations, feedback control system characteristics, system responses, stability of feedback systems, analysis of graphical tools such as root-locus and Nyquist diagram, compensator design based on root-locus and frequency response, and modern control system design. *Prereq.* *ECE 1332 and ECE 1347, and ECE 1235 taken concurrently.*
- ECE 1454 Communication Systems** 4 QH
Presents fundamentals of digital and analog communication systems with emphasis on digital communication schemes. Topics covered include random processes and noise characteristics, information sources and source coding, analog communication systems, transmission of digital data through AWGN channels, transmission of digital data through bandwidth constrained channels, digital carrier modulation schemes, channel capacity, and coding. *Prereq.* *ECE 1333 and MTH 1384.*
- ECE 1456 Digital Signal Processing** 4 QH
Introduces modern signal processing. Reviews discrete signals and systems; realization structures for digital filters, including direct forms, cascade forms, and parallel forms; digital filter design, including IIR filter design using impulse invariance and bilinear transformation; and FIR filter design using windowing and frequency sampling. Covers fast Fourier transforms; decimation-in-time and decimation-in-frequency; applications to fast convolution; and implementation of DSP algorithms, including special purpose hardware to applications in speech processing and spectral estimation. *Prereq.* *ECE 1333, and ECE 1234 taken concurrently.*
- ECE 1458 Communication Networks** 4 QH
Uses open systems interconnection (OSI) model as a framework for discussing design principles, management of complexity, standardized connectivity, and routing switching and multiplexing techniques used in networks to achieve connectivity and resource sharing. Topics include broadband integrated services digital networks (B-ISDN), personal communication networks (PCN), and techniques for modeling and evaluating network performance by analytical methods, simulations, or emulations.
- ECE 1462 Advanced Topics in Electromagnetic Field Theory** 4 QH
Continues the required courses in field theory. Topics include microwave and waveguide structures; careful development of electromagnetic energy and force concepts; and an introduction to radiation and antenna theory. *Prereq.* *ECE 1364.*
- ECE 1465 Wave Transmission and Reception** 4 QH
Discusses the transmission, radiation, and reception of electromagnetic waves at and above radio frequencies. Develops transmission-line theory using circuit theory approximations. Discusses matched lines, tuning stubs, and loaded transmission lines, together with the theory and applications of the Smith chart. Other topics include the linear antenna, radiation fields, directivity, gain, the aperture antenna, and the insulated antenna. *Prereq.* *ECE 1364.*
- ECE 1466 Optics of Photon Devices** 4 QH
Presents the basic optical concepts necessary for an understanding of quantum electronic devices. Analyzes the simple Lorentzian model of the interaction between electromagnetic waves and optical materials, modified to include necessary quantum concepts. Topics include propagation of electromagnetic waves in isotropic and nonisotropic media (crystal optics); reflection and refraction, polarization and double refraction; optical resonance and stability criteria; Gaussian beam propagation; systems with gain; coherent and noncoherent optical sources; and detection of optical signals. Considers specific devices including resonators, amplifiers, and oscillators; modulators and switches; and optical detectors. *Prereq.* *ECE 1364.*
- ECE 1471 Electrical Power Systems 1** 4 QH
Introduces electrical power systems, wherein three-phase circuits are analyzed under balanced steady-state operation. Topics include system elements and their characteristics and interaction, system modeling, network calculations, and an introduction to symmetrical components. *Prereq.* *ECE 1332.*
- ECE 1472 Electrical Power Systems 2** 4 QH
Continues basic studies in electrical power systems. Topics include power system load-flow analysis, symmetrical components and fault calculations, system protection, economic operation of power

systems, and an introduction to power system stability. *Prereq.* ECE 1471, and ECE 1231 taken concurrently.

ECE 1474 Power Electronics 4 QH

Presents the application of electronics to energy conversion and control. Studies phase-controlled rectifier circuits, DC-DC converters, high frequency inverters, and motion control systems. Examines power semiconductor devices: diode, bipolar and field effect transistors, and thyristors. Illustrates modeling, analysis and control techniques on numerous examples. *Prereq.* ECE 1347 and ECE 1365.

ECE 1481 Machine Language and Assembly Language Programming 4 QH

Focuses on study of the machine and assembly languages of a selected digital computer. Covers machine representation of numbers, characters, and instructions; machine language programming: flow of control, relocatability, input/output instructions, addressing, and instruction modification. Traces symbolic assembly language: macros, literals, and pseudo-instructions. Includes several programming projects. *Prereq.* ECE 1381.

ECE 1482 Programming Systems 4 QH

Continues ECE 1481. Discusses assemblers, searching and sorting techniques, and macroprocessors loaders. Introduces high-level languages and their compilation, and operating systems. Includes programming projects as an integral part of the course. *Prereq.* ECE 1481.

ECE 1484 Applied Discrete Analysis 4 QH

Introduces elementary number theory, modern algebra, combinatorial mathematics and discrete probability theory, including prime numbers, least common multiple, and greatest common divisor. Covers Euclid's algorithm, continued fractions, congruences, groups, rings, fields, Boolean algebra, combinations and permutations, generating functions, random variables, and Markov chains. *Prereq.* MTH 1225.

ECE 1486 Numerical Methods and Computer Applications 4 QH

Presents numerical techniques used in solving scientific and engineering problems with the aid of digital computers. Topics include modeling and simulating of deterministic and probabilistic systems; theory of interpolation; iteration methods; numerical solution of ordinary and partial differential equations; signal detection; and use libraries of scientific subroutines. Chooses representative problems for solution on a digital computer. *Prereq.* MTH 1225 and GE 1100.

General Engineering

The course descriptions listed under general engineering are intended to show the scope of the subject that will be covered. Since courses are continually updated, specific topics or methods of approach may vary from term to term.

GE 1101 Engineering Problem Solving and Computation 4 QH

Uses developing and structuring approaches to solve engineering problems. Draws applications from a variety of engineering disciplines which serve as a tool for introducing students to engineering analysis and design. Includes the design of problem-solving algorithms along with an introduction to the "C" programming language.

GE 1102 Engineering Problem Solving with Application Software 2 QH

Develops fundamental problem solving skills essential to all engineering disciplines. Introduces students to spreadsheet and math application packages and their use in solving engineering problems. Topics include data reduction and transformation, visualization of data and functions, problem structuring, and matrix applications. Examples stress real-life engineering analysis and design as a tool for introducing students to the engineering profession.

GE 1103 Engineering Design and Graphics 4 QH

Presents the engineering design process using case studies from a variety of engineering disciplines. Topics include problem formulation and specification, creativity, evaluation tools, patents, product liability, and presentation techniques. Presents engineering graphics, focusing on developing three-dimensional visualization skills and computer-aided design (CAD) application. Other topics include freehand sketching, CAD, orthographic projection, sectioning, auxiliary views, and dimensioning. Students will develop an original design solution to a technical problem as a term project and use CAD software extensively.

GE 1701 Engineering Problem Solving and Computation (Honors) 4 QH

Honors equivalent of GE 1101.

GE 1702 Engineering Problem Solving with Application Software (Honors) 2 QH

Honors equivalent of GE 1102.

GE 1703 Engineering Design and Graphics (Honors) 4 QH

Honors equivalent of GE 1103.

Industrial Engineering and Information Systems

IIS 1200 Work Design 4 QH

Covers the engineering design process, principles of work physiology, and workplace design from the standpoint of employee safety and effectiveness. Covers work measurement techniques, including direct measurement, synthetic standards, and work sampling. Includes a project in which principles of work design must be applied.

IIS 1300 Probabilistic Analysis for Engineers 4 QH

Presents probability theory axiomatically, with emphasis on sample space presentation of continuous and discrete random variables. Covers descriptive statistics, expected value of random variables, moment generating functions, sampling distribution, and point and interval estimations. *Prereq.* Integral and Differential Calculus.

IIS 1310 Statistics 4 QH

Examines the definition of a statistic, review of the distributions and approximations of random variables. Introduces hypothesis testing including tests of hypothesis for means, variances, and proportion. Covers nonparametric methods, analysis of variance, and simple linear regression. *Prereq.* IIS 1300.

IIS 1330 Principles of Computation and Programming I 4 QH

Reviews algorithms, computers, and programming; machine language programming (instruction, execution, and addressing techniques); coding and representation of data; program debugging and verification. Surveys machines, devices, and languages. *Prereq.* Higher-level language.

IIS 1340 Operations Research 1**4 QH**

Covers deterministic models, including LP and duality; transportation and allocation; sensitivity and post-optimality analyses; and network analysis, including maximal flow, shortest route, and PERT. *Prereq. MTH 1223.*

IIS 1341 Operations Research 2**4 QH**

Focuses on the stochastic models in operations research and their analytical development and solution. Topics include queuing models, deterministic and stochastic inventory models, Markov chains, and sequencing. Presents dynamic programming and recursive functional expressions. *Prereq. IIS 1310.*

IIS 1345 Management Information Systems**4 QH**

Examines the design and implementation of computer-based information systems. Topics include the value of information; tools of system analysis and design; impact of computer-based information systems on organizations and society; rudimentary computer architecture; input devices; data organization and storage; system configuration; communications; and output/display devices.

IIS 1350 Digital Simulation Techniques**4 QH**

Covers model design and development, validation, and experimentation for discrete event simulation models. Topics include problem formulation, data collection and analysis, random variable generation, and statistical analysis of output. Utilizes a major simulation language such as GPSS, SIMAN, or SIMSCRIPT. *Prereq. Higher-level language and IIS 1310.*

IIS 1360 Engineering Economy**4 QH**

Familiarizes the student with the theory and techniques of economic design and evaluation of an investment project. Presents introductory steps in the analysis of investment proposals, time value of money, and cash flows. Analyzes cash flows in terms of present worth, annual cost, rate of return, and benefit/cost ratio. Studies decision tree for sequential decisions, value of information, effect of accounting procedures, and taxes on investment analysis.

IIS 1366 Engineering Economy**4 QH**

Covers the formulation of analytical techniques, such as rate of return, present worth, and annual cost. Considers the application of these techniques to solve business and engineering problems involving design, selection, replacement, lease-buy decisions, and decisions among multiple alternatives. Introduces sensitivity analysis and basic probability in cases where uncertainty exists. Surveys sources and costs of capital, debt-versus-equity financing, and leverage. *Not open to industrial engineering majors.*

IIS 1400 Systems**4 QH**

Examines modeling, analysis, and control of linear feedback systems through consideration of the following topics: differential equations as system models; transfer functions and block diagrams; system components and the method of analogies; accuracy, and stability. *Prereq. MTH 1230.*

IIS 1401 Design Project**4 QH**

Examines analysis and design of major industrial engineering systems. Students are expected to undertake up to five projects drawn from line balancing, job shop scheduling, stochastic network analysis, reliability in design, complex queuing system design, sequencing, or other areas of student and faculty interest. *Prereq. IIS 1341, IIS 1350, IIS 1360, and IIS 1405.*

IIS 1405 Production and Inventory Control**4 QH**

Explores design of basic inventory models and inventory management systems, single-stage and multi-stage systems and their dynamics, production control and aggregate planning, and mathematical and heuristic approaches to aggregate scheduling. Topics include cost structure and decision-oriented analyses, and consideration of job shop scheduling and dispatching problems. *Prereq. IIS 1310 and IIS 1340.*

IIS 1415 Facilities Design**4 QH**

Examines the use of descriptive and optimizing models (for example, simulation, queuing theory, and linear programming) to design facilities and associated materials-handling systems. Applies computer-assisted layout analysis techniques to problems of real-world scope. *Prereq. IIS 1340.*

IIS 1425 Material Handling System Design**4 QH**

Discusses the design and analysis of large material handling systems. Topics include computer control of handling systems, integration with production and inspection, automated storage/retrieval systems, automatic identification systems, and systems acquisitions. *Prereq. IIS 1340.*

IIS 1436 Quality Assurance**4 QH**

Covers basic principles to state-of-the-art concepts and application of statistical process control and design. Applies principles to a variety of products. Topics include measuring and controlling product quality, Shewhart control charts, quality cost, pareto analysis, discrete and variable sampling, and military standards in quality control. *Prereq. IIS 1310.*

IIS 1450 Expert Systems**4 QH**

Introduces students to the theory, topics, and applications of expert systems in engineering. Topics include knowledge representations formats (production rules, frames, networks, and logic systems), heuristics in engineering (deterministic and nondeterministic), fuzzy logic, certainty factors, cognition, memory, decision strategies, design of expert systems, shells, machine learning techniques, current research goals, and applications in engineering. Each student must complete a design project in expert systems development and/or application. *Prereq. GE 1100, IIS 1300, IIS 1330, or permission of instructor.*

IIS 1466 Manufacturing Automation**4 QH**

Familiarizes students with the process of manufacturing and potential for automation. Studies designing for automation including required hardware and software. Involves hands-on experience with robotics programming and implementation, programmable control programming, and CNC machine programming using APT and G code. *Prereq. IIS 1330 and IIS 1465, or permission of instructor.*

IIS 1470 Human Considerations in Engineering Design**4 QH**

Introduces human factors with emphasis on the physiological and anthropometric bases of equipment and workplace design. Topics include an overview of the field of human factors; work, fatigue, and endurance; thermal regulation and heat stress; biomechanics; effects of aging on work capacity; and body response to vibration.

IIS 1475 Human-Machine Systems**4 QH**

Emphasizes human sensory/motor performance, information-processing capabilities, learning, and skilled-task performance. Topics include an introduction to the experiment as a source of knowledge of human performance characteristics; vision, visual

performance, and principles of display design; audition, noise, hearing damage, and auditory signals; information processing; signal detection; aging effects; and system development.

IIS 1777 Honors Adjunct

1 QH

To be added to any 4 quarter hour course in the department when approved by the Honors Committee of the College of Engineering. Once approved, the adjunct information is forwarded to the Honors Office for dissemination to the honors membership. Students may enroll in IIS 1777 an unlimited number of times as it can be an adjunct to any industrial engineering course.

IIS 1800 Independent Study in Industrial Engineering

4 QH

Allows independent study on advanced IE topics for students usually in the senior year and with high scholastic standing. Projects may be of an applied or theoretical nature. A formal report is submitted to student's project supervisor at the end of quarter.

Mechanical Engineering

ME 1201 Statics

5 QH

Examines vector representation of force and moment; equivalent force systems; centroids and centers of gravity; and distributed forces. Investigates equations of equilibrium; free-body diagrams; applications to trusses, pin-connected frames, and beams; shear and moment diagrams; and elementary concepts in friction. Introduces virtual work. *Prereq.* PHY 1222.

ME 1202 Dynamics I

5 QH

Develops problem-solving ability in the fundamentals of dynamics. Topics include kinematics of particles, kinematics of rigid bodies, and mass moments of inertia. Examines kinetics of particles and rigid bodies using force, mass, and acceleration. *Prereq.* ME 1201.

ME 1203 Strength of Materials I

5 QH

Explores the concept of stress and strain; state of stress and strain at a point; and stress-strain relations and material properties. Investigates moment of inertia of areas; stress and deformation of simple members under axial and torsional loads; and stresses in symmetrical beam bending. Involves lab sessions to support the lectures. *Prereq.* ME 1201.

ME 1314 Strength of Materials 2

4 QH

Covers asymmetrical bending; analysis of determinate and indeterminate beams by various methods; and buckling of columns. *Prereq.* ME 1203.

ME 1315 Dynamics 2

4 QH

Continues development of problem-solving ability in dynamics. Topics include kinematics of rigid bodies using rotating frames, kinetics of particles and rigid bodies using work and energy, introduction of Lagrange's equations, kinetics of particles and rigid bodies using impulse and momentum, and simple gyroscopic motion. *Prereq.* ME 1202.

ME 1320 Dynamics for Civil Engineers

4 QH

Covers kinematics, translating reference frames, mass moments of inertia, plane motion of rigid bodies, and instantaneous equations of motion. *Prereq.* CIV 1210.

ME 1321 Mechanics for Electrical Engineers

4 QH

Focuses on the study of the mechanics of rigid bodies, instantaneous equations of motion, work and energy, and impulse and momentum. *Prereq.* PHY 1222.

ME 1335 Mechanical Design

5 QH

Covers applications to the design process of the basic concepts of mechanics, strength of materials, and mechanical behavior of materials. Discusses basic considerations in design and its open-ended nature. Reviews fundamentals of stress and deflection analysis; theories of failure; design for fatigue strength; product liability; numerical methods in design, modeling, simulation; and optimization of mechanical systems. *Prereq.* ME 1314.

ME 1336 Design Project 1

5 QH

Applies the engineering sciences to the design of a system, component, or process. Students will choose the particular design project with the approval of appropriate faculty. Design teams will be organized. Each project will include the use of open-ended problems, development and use of design methodology, formulation of design problem statements and specifications, consideration of alternative solutions, feasibility considerations, and detailed system descriptions. It should include realistic constraints (such as economic factors, safety, reliability, maintenance, aesthetics, ethics, and social impact). *Prereq.* ME 1335 and ME 1337.

ME 1337 Thermal Design

5 QH

Focuses on developing the ability of the students to synthesize their knowledge and understanding of the concepts of thermodynamics, fluid mechanics, and heat transfer to meet the specifications of various thermal design objectives through the assignment of open-ended problems. Reviews fundamentals of heat transfer and fluid mechanics, numerical methods in heat transfer, heat transfer analysis of heat exchangers, heat exchanger pressure drop analysis, modeling, system simulation, and topics in optimization. One or more design projects are assigned. Utilizes various software on mainframe and microcomputers throughout the course and in the projects. *Prereq.* ME 1365.

ME 1338 Design Project 2

5 QH

Continues the project started in ME 1336. Students remain in the same group and under the direction of the same faculty advisers as in ME 1336. These guidelines may be waived in exceptional cases with the department chair's approval. *Prereq.* ME 1336.

ME 1340 Thermodynamics

4 QH

Studies the systems in which energy and its flow across systems boundaries are important. In this course, energy, heat, and work are defined and used in the First Law of Thermodynamics. Introduces other thermodynamic properties and equations of state, with emphasis on tabular and graphical forms for simple compressible systems and on the ideal gas. Introduces the Second Law of Thermodynamics and the property entropy, and discusses their macro- and microscopic implications. Concentrates on basic concepts and their proper application to representative engineering systems. *Prereq.* MTH 1223; not open to mechanical engineering majors.

ME 1360 Thermodynamics I

5 QH

Defines energy, heat, and work in the First Law of Thermodynamics. Introduces other thermodynamic properties and equations of state, with emphasis on tabular and graphical forms for simple and compressible systems on the ideal gas. Discusses phases and phase

transitions, and examines energy analysis of both open and closed systems. Introduces macro- and microscopic implications of the Second Law of Thermodynamics and the property entropy, and discusses their macro- and microscopic implications. Emphasizes the macroscopic consequences of irreversibility and the limitation this places, through the Second Law, on the behavior of engineering systems. This course meets four times weekly and integrates problem-solving strategies while concentrating on basic concepts. *Prereq.* MTH 1223 taken concurrently.

ME 1361 Thermodynamics 2

5 QH

Studies of vapor power systems including the Rankine cycle and its modifications for use with both fossil and nuclear fuels, vapor refrigeration systems, and all-gas cycles including the Brayton cycle and its modifications; the Otto cycle; the Diesel cycle; and supercharging and turbo-charging. Introduces the concepts of availability and irreversibility and thermodynamics of nonreacting mixtures with applications to air/water/vapor mixtures for air-conditioning systems and cooling towers. Discusses the elements of optimum power plant design. *Prereq.* ME 1360.

ME 1362 Thermodynamics 3

5 QH

Continues the thermofluids sequence. Topics include thermodynamic relations using generalized charts; reacting gas mixtures and combustion; and chemical equilibrium. Introduces one-dimensional compressible flow, including isentropic flow with area change; and normal shock waves. Includes a lab. *Prereq.* ME 1361.

ME 1365 Heat Transfer

5 QH

Studies the theories that describe conduction, convection, and thermal radiation heat transfer mechanisms. Discusses steady-state and transient conduction problems in rectangular, cylindrical, and spherical coordinate systems. Studies convective heat transfer mechanisms, and introduces various correlations. Presents a description of thermal radiation heat transfer between surfaces. Includes various lab experiments. *Prereq.* ME 1360, ME 1375, and MTH 1226.

ME 1375 Fluid Mechanics

5 QH

Studies fundamental principles in fluid mechanics. Topics include hydrostatics (pressure distribution, forces on submerged surfaces, and buoyancy); Newton's law of viscosity; dimensional analysis; integral forms of the basic laws (conservation of mass, momentum, and energy); pipe flow analysis; and differential formulation of basic laws with laminar flow analyses. Includes labs and a computer project. *Prereq.* ME 1360 and MTH 1225.

ME 1380 Materials Science

5 QH

Introduces materials science for engineers, emphasizing the structure/property/function relation. Topics include crystallography, structure of solids, imperfections in crystals, phase equilibrium, phase transformations, diffusion, and physical/electrical properties. Includes a lab. *Prereq.* CHM 1132 and ME 1360.

ME 1386 Materials Science

4 QH

Introduces materials science for engineers, emphasizing the structure/property/function relation. Topics include crystallography, structure of solids, imperfections in crystals, phase equilibrium, electrical and magnetic properties of metals, semiconductors and junctions. *Prereq.* CHM 1132.

ME 1392 Measurements and Analysis

5 QH

Examines design of experiments, instrumentation, measurements, data analysis, and report writing. Applies the principles developed

in class to a variety of lab experiments. Requires written reports. Topics include force, strain, rotational frequency, temperature, pressure, power, and A/D conversion techniques. Lab fee.

ME 1401 Advanced Strength and Applied Elasticity

4 QH

Covers analysis of curved beams, rings, and thick-walled pressure vessels; introduction to plane elasticity problems using rectangular and polar coordinate systems; and concepts of stress and strength. *Prereq.* ME 1314.

ME 1408 System Analysis and Control

4 QH

Explores the theoretical background necessary to analyze and design simple linear control systems. Focuses on system modeling, linear approximations and their limitations, transfer functions, and block diagrams; transient and frequency response; and stability. Discusses frequency domain and root locus techniques. *Prereq.* ME 1315.

ME 1415 Mechanical Vibrations

5 QH

Studies free and forced vibrations of undamped and damped one-degree-of-freedom systems. Includes rotational unbalance, support motion, vibration isolation, vibration measuring equipment, non-viscous damping, general periodic excitation, non-periodic excitation using numerical methods. Examines free and forced vibration of multi-degree-of-freedom systems, the vibration absorber, coordinate coupling, and normal modes of vibration. *Prereq.* ME 1202.

ME 1435 Computer-Aided Design

4 QH

Introduces the concepts of computational and numerical geometry for design. Includes the implementation of computer graphics in design and use of computer-aided design packages. Covers principles of numerical control techniques to design and manufacture. Requires a design project. *Prereq.* GE 1103 and ME 1314.

ME 1436 Advanced Computer-Aided Design

4 QH

Covers advanced applications of interactive graphics concepts to different engineering tasks including animation; solid modeling; numerical control; mass properties; finite element modeling and analysis; and other traditional engineering analysis. Presents advanced concepts and features of interactive graphics and analysis programming languages. Includes FORTRAN interface and CAD/CAM packages to give students hands-on experience in lab settings. Requires a design project. *Prereq.* ME 1435.

ME 1470 Fluid Mechanics 2

4 QH

Covers velocity potential and stream functions; circulation and Kelvin's theorem; two-dimensional, steady irrotational incompressible flow; and Karman-Pohlhausen method applied to two-dimensional boundary layers. *Prereq.* ME 1375.

ME 1473 Gas Dynamics

4 QH

Focuses on application of the principles of fluid mechanics to compressible flows. Discusses wave propagation and the concepts of sound speed and Mach number. Emphasizes one-dimensional steady flows including the effects of area change, friction, and heat transfer. Considers normal shock waves and the possibility of choking. *Prereq.* ME 1375.

ME 1480 Mechanical Behavior of Materials

4 QH

Studies the physical basis for the mechanical behavior of solid materials, including elasticity, plasticity, viscoelasticity, and fracture. Discusses structural alloys and polymers. *Prereq.* ME 1203 and ME 1380.

ME 1483 Materials Processing 4 QH

Surveys the essential features and materials limitation of various methods for processing materials. Topics include heat treatment (ferrous and nonferrous alloys), casting, forming, joining, and machining. *Prereq.* ME 1380.

ME 1490 Special Topics 4 QH

When offered, topics will vary depending on the interests of a group of students and/or of the department. *Prereq.* *Permission of the department.*

ME 1496 Mechanical Engineering Project 1 4 QH

Involves a project of an analytical or experimental nature. Each student must, before the end of the first week of the quarter, obtain written approval for a proposed project from the department chair and a department faculty member under whom the student will work. A formal report must be submitted to the faculty supervisor at the end of the quarter. *Prereq.* *Senior standing.*

ME 1545 Internal Combustion Engines 4 QH

Presents the concepts and theories of operation of internal combustion engines based upon the fundamental engineering sciences of thermodynamics, gas dynamics, heat transfer, and mechanics. Discusses the design and operating characteristics of conventional spark-ignition, compression-ignition, Wankel, and stratified charge spark-ignition engines. Includes performance analysis using computer programs and Newhall-Starkman charts. *Prereq.* ME 1362.

ME 1580 Engineering Materials 4 QH

Discusses the utilization of materials science in the application and selection of materials. Topics include reactions with environment, such as oxidation and corrosion; materials selection criteria; and materials engineering case studies dealing with materials selection and failure analysis. *Prereq.* ME 1380.

ME 1702 Dynamics 1 (Honors) 5 QH

Honors equivalent of ME 1202. The honors section will meet as a separate recitation section for additional lectures and other activities related to the theory and applications of dynamics. *Prereq.* ME 1201.

ME 1703 Strength of Materials 1 (Honors) 5 QH

Honors equivalent of ME 1203. The honors section meets separately for lab and other activities related to the theory and applications of strength of materials. *Prereq.* ME 1201.

ME 1760 Thermodynamics 1 (Honors) 5 QH

Honors equivalent of ME 1360. The honors section will meet as a separate recitation section for additional lectures and other activities related to the theory and applications of thermodynamics. *Prereq.* MTH 1223 taken concurrently.

ME 1765 Heat Transfer (Honors) 5 QH

Honors equivalent of ME 1365. The honors section meets separately for lab and other activities related to the theory and applications of heat transfer. *Prereq.* ME 1360, ME 1375, and MTH 1226.

ME 1777 Honors Adjunct 1 QH

To be added to any 4 QH course in the department when approved by the Honors Committee of the College of Engineering. Once approved, the adjunct information is forwarded to the honors office for dissemination to the honors membership. Students may

enroll in ME 1777 an unlimited number of times as it can be an adjunct to any mechanical engineering course.

ME 1796 Independent Study/Research 1 (Honors) 4 QH

Involves an analytical or experimental project. Before the end of the first week of the quarter, each student must obtain written approval for a proposed project from a department faculty member under whom the student will work and from the College of Engineering's Honors Committee. A formal report must be submitted to the faculty supervisor at the end of the quarter. *Prereq.* *Junior or senior standing in the honors program.*

ME 1797 Independent Study/Research 2 (Honors) 4 QH

Continues ME 1796. *Prereq.* ME 1796.

Engineering Technology

Computer Technology

CT 1150 Computer Organization

4 QH

Presents basic computer architecture. Topics include number systems' operation and conversion, logic circuits, registers, data busses, ROM/RAM, microcomputer structure and operation, microprocessor internal components, microprocessor programming, and input/output processing. *Prereq.* CT 1105.

CT 1311 Programming with C Language

4 QH

Teaches C, a general purpose language suitable for programming operating systems, text-processing, and databases. Covers functions, arrays, character strings, global and local variables, scope rules, pointers, address arithmetic, structures, unions, and singular linked lists. A project is required. *Prereq.* GET 1100.

CT 1315 FORTRAN Laboratory

2 QH

Examines elements of the FORTRAN language with emphasis on structured programming. Topics include matrices, subroutines, functions, random number generators, and file handling. Students use the University's computer laboratory facilities to run programs. *Prereq.* CT 1311 or CT 4311.

CT 1330 Data Structures

4 QH

Introduces methods of representing and manipulating data in computer memory. Topics include stacks, queues, lists, trees, heaps, sets, graphs, searching, and sorting. *Prereq.* CT 1311.

CT 1335 Numerical Methods

4 QH

Presents computer methods for solving mathematical problems. Involves writing and running application programs using the University's computer facilities. Covers deterministic versus stochastic methods, random number generators, iterative versus noniterative solutions, maxima and minima in two and three variables, curve fitting in two and three variables, integrals, trapezoidal and Simpson's rules, slopes, difference equations in two and three variables, vector and matrix algebra, simultaneous linear equations, nonlinear equations, permutations, and combinations. *Prereq.* CT 1311 and MTH 1195.

CT 1340 Software Engineering Design

4 QH

Offers structured methods for developing complex computer software. Provides students the opportunity to develop structured specifications, structured designs, and computer programs for complex problems and to test those programs using the University's computers. Topics include partitioning, hierarchical organization, data flow diagrams, data dictionaries, structured English, decision trees, decision tables, structured charts, team design, structured programs, and maintainability. *Prereq.* CT 1311 or CT 4311.

CT 1345 Assembly Language

4 QH

Teaches typical microprocessor assembly language. Involves writing and running programs on a 68000 microprocessor-based system. Covers CPU architecture, instruction sets, addressing modes, binary operation, code conversion, subroutines, macros, and input/output. *Prereq.* CT 1311 and CT 1150.

CT 1348 LISP

4 QH

Introduces an interactive language in which the LISP interpreter is commonly referred to as the read-evaluate-print loop. Discusses LISP's various levels of implementation in detail. Explores LISP as an excellent medium for implementing standard techniques in data-structure manipulation, techniques for recursion, complex data structures, storage management, and symbol-table manipulation. *Prereq.* CT 1330 or CT 4330.

CT 1351 Advanced Computer Organization

4 QH

Examines the functional characteristics of complex and special-purpose computer systems, the functions of a general-purpose multiuser, and a multiprocessing operating system. Advanced topics include virtual memory and virtual machine architectures, distributed and multiprocessor systems, array processors, and system performance analysis. *Prereq.* CT 1356 and CT 1375, or CT 4356 and CT 4375.

CT 1355 Microprocessor Peripheral Hardware

4 QH

Covers the elements of microprocessor peripheral hardware and its interfacing. Involves designing and analyzing microprocessor systems, including detailed schematics, timing diagrams, and technical documentation. Topics include serial input/output devices, DMA and interrupt control devices, standard busses, bus arbitration techniques, and bus support VLSI. *Prereq.* CT 1374.

CT 1356 Complex Peripheral Hardware

4 QH

Studies the interfacing and implementation of complex peripheral systems. Topics include disk and tape interfaces, graphic display devices, communication interfaces and subsystems, and input/output processors. *Prereq.* CT 1355.

CT 1360 Industry Software

4 QH

Surveys current commercial software packages and methods. Involves the exercise of commercial packages implemented on the University's computer facilities where applicable. Topics include specific current packages and methods drawn from the categories of database management, scientific and statistical analysis, security and privacy, software assurance, and documentation. *Prereq.* CT 1381.

CT 1363 Concurrent Programming

4 QH

Examines the principles of concurrent programming. Involves writing and running programs to demonstrate aspects of concurrent programming techniques and issues. Explores correctness of concurrent programs, material exclusion, the timing of Dekker's algorithms, the producer-consumer problem, monitors, semaphores, "Ada Rendezvous," critical regions, and conditional variables. *Prereq.* CT 1330 and CT 1340, or CT 4330 and CT 4340.

CT 1365 Industry Hardware

4 QH

Discusses the latest industrial developments and trends in computer hardware. Conducted as a seminar. *Prereq.* CT 1356.

CT 1368 Semiconductor Logic

4 QH

Analyzes the bipolar and MOS transistors in saturated and cutoff conditions. Examines implementing these concepts to form basic logic circuits and standard logic families, and to convert logical expressions into hardware configuration representations. Topics include Ebers-Moll modeling, PMOS, NMOS, CMOS, bipolar characteristics, and standard logic families. *Prereq.* EET 1311.

CT 1369 Computer Logic**4 QH**

Introduces the hardware building blocks of digital computers. Teaches students to specify configurations of gates and memory components to achieve combinational and sequential composite logical functions, and perform finite state machine design and analysis. Topics include gates, flip-flops, registers, decoders, ALUs, memory arrays, and synchronous and asynchronous state machines. *Prereq.* CT 1368.

CT 1374 Introduction to CPU Hardware**4 QH**

Introduces the circuits and operation of a microcomputer. Studies the microprocessor and its basic support components and circuits, including detailed timing and functional analysis of their interactions. Topics include central processing unit, memory, addressing, clocking, bus concepts, interrupts, coprocessors, input/output, and instruction timing. *Prereq.* CT 1345 or CT 4345, and CT 1368 or CT 4368.

CT 1375 CPU Architecture**4 QH**

Presents high performance microprocessor architecture and hardware interfacing techniques. Analyzes current commercial processors and their support components. Topics include internal CPU architecture, memory management, instruction prefetch, privilege states, bus cycles, control lines, input/output, interrupts, exceptions, and pipelining. *Prereq.* CT 1374.

CT 1377 VLSI Design**4 QH**

Introduces Very Large Scale Integration (VLSI) integrated circuits (ICs), the key components of all modern computers. Examines MOS devices, circuits, design methods, and fabrication techniques used in producing custom VLSI ICs. Topics include MOS transistor characteristics; basic gate circuits; scaling; layout tools, both manual and automated; wafer-fabrication techniques; standards; testing; and costs. *Prereq.* CT 1369.

CT 1380 Data Communication Methods**4 QH**

Discusses the ISO Open Systems Interconnect model for communication systems, including the functional and operational aspects of data communication devices and software. Uses a black box approach. Topics include modems, control units, multiplexers, concentrators, front-end processors, and error checking. *Prereq.* CT 1375.

CT 1381 Operating Systems**4 QH**

Introduces the basic principles and organization of operating system implementation. Topics include processor management, process multiplexing and synchronization, schedules, atomic operations and mutual exclusion, sequential and concurrent programming, memory, and device and data management. *Prereq.* CT 1330 and CT 1345.

CT 1382 Computer Graphics Programming**4 QH**

Explores the computer plotting of two- and three-dimensional shapes. Involves writing and running programs using the University's computer and digital plotter. Considers 2D transforms; 3D to 2D transforms; surface representation; shaping; hidden line; raster technology-color; introduction to interactive graphics and characters; curve fitting; and graphic data structures. *Prereq.* GET 1100.

CT 1383 Databases**4 QH**

Examines database organization structure and management. Involves writing and running programs exemplifying techniques developed in class, using the University's computer facilities.

Topics include access methods, attributes, indices, keys, querying, searching and matching, file sets, inverted file sets, normal forms, and random access. *Prereq.* CT 1330.

CT 1384 Large System Assembly Languages**4 QH**

Utilizes VAX-11 assembly language macro to show how basic components in the CPU are used during program execution. Emphasizes integer, real, and character instruction sets; various address techniques; procedure linkage; and main and system input/output. Utilizes the University's computer facilities to run program assignments. *Prereq.* CT 1345 or CT 4345.

CT 1387 Bit-Slice Microcomputers**4 QH**

Demonstrates the basic design ground rules common to the bit-slice CPU style of hardware design. *Prereq.* CT 1355 or CT 4355.

CT 1389 Single-Chip Microprocessors**4 QH**

Explains the hardware limitations of a single-chip system. When small 8-bit intelligent devices are rewired in high volume, the single-chip microprocessor in the form of the 3870, 8084 Z8, and others comes into play. *Prereq.* CT 1374 or CT 4374.

CT 1390 Special Problems in Computer Technology**4 QH**

Students perform theoretical or experimental work under individual faculty supervision. *Prereq.* Permission of department chair.

CT 1391 Topics in Computer Technology**4 QH**

Focuses on advanced topics in Computer Technology to be selected by the instructor. *Prereq.* Permission of the instructor.

CT 1393 UNIX Operating System**4 QH**

Surveys advanced topics related to UNIX and its filing system. Studies the advance features in the editor and system utilities as well as the general theory of an operating system with emphasis on the relationship between the kernel, filing system, and standard libraries. Discusses low level I/O, forks, pipes, and signaling and introduces the use of nroff, sed, lint, cc, lex, and yacc. *Prereq.* CT 1330 or CT 4330.

CT 1395 Computer Security**4 QH**

Focuses on issues related to security in computing, including the history of security, encryption techniques and applications, secure communications, and software protection. Covers software verification and validation, security design in hardware, and products currently available for recurring systems and data. Discusses privacy as well as reliability. *Prereq.* CT 1380 or CT 4380.

CT 1396 PROLOG: An Introduction to Artificial Intelligence**4 QH**

Introduces fundamental artificial intelligence (AI) terms and techniques using PROLOG as a programming language. Topics include knowledge representation, search, parsing, logic, and inference techniques. Uses student projects as an integral part of the course. *Prereq.* CT 1330 or CT 4330.

CT 1480 Local Area Networks I**4 QH**

Introduces local area network (LAN) concepts, architectures, application, protocols, and components. Focuses on first three layers of the ISO reference model: physical, data line, and network layers. Examines Ethernet, SNA, Token Bus, Token Ring, and other IEEE standards. *Prereq.* CT 1380 or CT 4380. Not open to students who have taken CT 1379 or CT 4379.

CT 1481 Local Area Networks 2**4 QH**

Examines the upper four layers of the ISO reference model; transport, session, presentation and application layers. Topics include TCP/IP, DECNET, NETBIOS, FTP, TELNET, and E-MAIL. *Prereq.* CT 4480 or CT 1480.

CT 1492 Independent Study in Computer Technology**4 QH**

Independent study of advanced computer technology projects for students usually in the upper junior or senior year having high scholastic standing. Projects may be of an applied or theoretical nature resulting in a formal report submitted to the project supervisor at the end of the quarter. *Prereq.* Permission of advisor and project supervisor.

Electrical Engineering Technology

EET 1151 Circuit Analysis 1**4 QH**

Examines Ohm's law, Kirchhoff's current and voltage laws, equivalent resistances, independent and dependent sources, mesh and nodal analysis, and power relations, all concentrating on direct current circuits. Other topics include Thevenin and Norton theorems, the operational amplifier, and energy storage elements such as capacitors and inductors. *Prereq.* MTH 1193 or PHY 1193.

EET 1152 Circuit Analysis 2**4 QH**

Studies time domain (transient) analysis of R, L, and C elements; energy storage in L and C circuits; and responses in source-free RL and RC circuits. Includes application of the unit step function and response of RLC circuits. Introduces frequency domain methods to solve sinusoidal steady-state circuits using complex frequency concepts and phasor algebra; three-phase circuits; and three-wire, single-phase systems. *Prereq.* EET 1151.

EET 1310 Electrical Measurements**4 QH**

Covers standards of measurements, dimensional analysis, errors and measurement of dispersed data, discrete and continuous variables, binomial distribution, and normal distribution. Topics include guaranteed error, methods of resistance measurements, digital voltmeters and analog-to-digital conversion, voltage references, and potentiometers and AC bridges. *Prereq.* EET 1353.

EET 1311 Electronics 1**4 QH**

Introduces elements of digital electronics, starting with the binary number system and proceeding to Boolean algebra and DeMorgan's theorems. Discusses combinatorial logic in detail and the basic circuitry to realize AND, OR, and NOT devices. Gives an introduction to sequential logic and the bistable devices required to realize it. Proceeds to the basic sequential circuits such as counters and shift registers. Includes the analysis and design of both combinatorial and sequential circuits. *Prereq.* EET 1152.

EET 1312 Electronics 2**4 QH**

Reviews the theory of linear circuits and extends it to simple non-linear circuits of both the two-terminal variety and the three-terminal variety. Considers the solid-state theory of the PN diode as an example of the two-terminal non-linear device, and the NPN, PNP, and field-effect devices as examples of the three terminal non-linear elements. Includes light-sensitive and heat-sensitive solid-state devices. Considers the problem of selecting an operating point for a non-linear device, and the corresponding practical methods of providing the required biases. Introduces the small-signal linear model for the non-linear device in the vicinity of the operating point. *Prereq.* EET 1152, PHY 1193.

EET 1313 Electronics 3**4 QH**

Reviews the small-signal models for three-terminal devices and discusses the frequency response of such models, including the db vs log frequency plots of Henrick W. Bode. Examines operational amplifiers, including their ideal behavior and the limitations introduced by finite input and output impedances, finite gain, and finite bandwidth. Examines the general concept of feedback and the stability problems which it introduces and applications of feedback to the design of oscillators and active filters. *Prereq.* EET 1312.

EET 1314 Pulse and Digital 1**4 QH**

Reviews the basic concept of Boolean algebra, combinatorial logic, and binary arithmetic, and extends them to the design of coding systems such as binary, binary-coded decimal, Gray code, seven-segment displays, and multiplexers. Introduces flip-flops and sequential logic circuits such as ripple counters, synchronous counters, ring counters and Johnson counters, shift registers, solid-state memory devices, and the 555 timer. Emphasizes design of digital systems using the available microelectronic gates, primarily in the TTL series. *Prereq.* EET 1313.

EET 1315 Pulse and Digital 2**4 QH**

Examines the physical devices that are used to realize digital circuits, as a complement to the previous treatment of idealized mathematical models. Introduces the concepts of rise-time, fall-time, set-up time, hold time, delay time, and the maximum frequency of a clock. Discusses the presently available logic families such as TTL, CMOS, and EC, compares them, and considers the problems of interconnecting them. Introduces memory elements and field-programmable logic elements. Presents interfacing devices such as analog-to-digital and digital-to-analog converters. *Prereq.* EET 1314.

EET 1317 Principles of Communication Systems 1**4 QH**

Focuses on signal analysis using Fourier methods, noise in communication systems, frequency selective amplifiers, including wideband, transistor power amplifiers AF and RF, oscillators, and signal sources and applications. *Prereq.* EET 1313.

EET 1318 Principles of Communication Systems 2**4 QH**

Explores basic theory of amplitude, frequency, phase and pulse code modulated systems, analysis of modulating and demodulating circuits. Topics include carrier systems using SSB, system block and level diagrams, logic control circuits in communication systems, and modems. *Prereq.* EET 1317.

EET 1319 Principles of Communication Systems 3**4 QH**

Emphasizes the fundamentals of digital communications, sampling requirements, analog-to-digital conversion methods, and system capacity and bandwidth. Topics include comparison of practical digital systems PAM, PCM, PFM, PWM, time and frequency division multiplexing, data decoding, and selected examples from telemetry and computer links. *Prereq.* EET 1318.

EET 1320 Electricity and Electronics 1**4 QH**

Introduces circuit analysis, resistive networks, periodic excitation function, steady state AC circuits, the physical foundations of electronics, and the physical operation of electronic devices. *Prereq.* MTH 1193 and PHY 1193. Not open to electrical engineering technology majors.

EET 1321 Electricity and Electronics 2

Examines single-stage electronic circuits, magnetic circuits and transformers, electro-mechanical energy conversion, DC machines, and AC machines. *Prereq. EET 1320.*

EET 1323 Electronic Laboratory

Offers experiments with nonlinear semiconductors. Explores junction and zener diodes. Studies typical applications in clippers, clampers, rectification, filtering, electronic power supplies, voltage regulation, and integrated circuit regulators. Discusses bipolar and field effect transistors, amplifiers and voltage follower configurations, special semiconductors, and operational amplifiers. *Prereq. EET 1311.*

EET 1324 Circuits Laboratory 1

Offers experiments in DC electrical circuits and measurement techniques. Includes use of ammeters, ohmmeters, voltmeters, VOMs, and power supplies. Studies equivalent resistance, series and parallel circuits, Ohm's law, Thevenin and Norton theorems, and superposition and maximum power transfer theorems. *Prereq. EET 1151.*

EET 1325 Circuits Laboratory 2

Offers further experiments in electrical circuits and measurement techniques. Includes operation of oscilloscopes, audio frequency, and function generators. Explores inductance and capacitance, and the effect of frequency upon them. Studies amplitude, frequency, and phase shift measurements using a variety of series/parallel RL, RC, and RLC circuitry. Examines circuit time constants and their relation to repetition rate, along with resonance, circuit quality, and filter circuits. *Prereq. EET 1124.*

EET 1327 Advanced Electronics Laboratory 1

Offers experiments using oscilloscopes, the examination of transistor audio amplifiers, push-pull amplifiers, drivers, pulse and video amplifiers. Topics include active filters, frequency modulation circuits, audio frequency oscillators, and the study of operational amplifiers. *Prereq. EET 1323.*

EET 1328 Advanced Electronics Laboratory 2

Experiments with the modulation of a class C amplifier, the diode detector, basic timing circuits, RF and crystal oscillators, astable multivibrators, logic gates, flip-flops, binary adders, registers and counters. Topics include active filters, frequency modulation detectors, and analog-to-digital and digital-to-analog conversion. *Prereq. EET 1327.*

EET 1329 Advanced Electronics Laboratory 3

Studies FM and PM waves, amplitude limiters, the balanced modulators and single sideband generators. Discusses integrated circuit timers and monolithic random access memory, and monolithic phase-locked loop, as well as a series of microwave experiments and digital experiments. *Prereq. EET 1328.*

EET 1330 Energy Conversion

Investigates generalized theory of rotating energy conversion devices, steady-state operation of the multiply-excited direct-current machine, control of speed, special machines, transformers, steady-state considerations of induction and synchronous machines. Explores the generalized machine and circuit model, and Laplace transform techniques applied to the analysis of dynamic operating modes of rotating machines. *Prereq. EET 1152 and MTH 1195.*

4 QH**2 QH****2 QH****2 QH****2 QH****2 QH****2 QH****4 QH****EET 1337 Distributed Systems**

Examines radiation, transmission, and reception of electromagnetic waves, distributed-line constants and traveling waves of transmission lines, and differential equations of the uniform line. *Prereq. MTH 1195 and PHY 1193.*

4 QH**EET 1353 Circuits Analysis 3**

Applies differential equations to the solutions of linear, and time-invariant electrical networks. Introduces to singularity functions, convolution, and time-domain transient analysis, network topology and duality, and the methods of transformation calculus and complex frequency concepts. *Prereq. EET 1152.*

4 QH**EET 1354 Circuits Analysis 4**

Focuses on signal analysis in the frequency domain, Fourier series, Fourier and Laplace transform methods, and a varied selection of circuit problems using Laplace transforms and related theorems. *Prereq. EET 1353.*

4 QH**EET 1360 Engineering Analysis 1**

Studies linear algebra and circuit equation applications, as well as solution of linear differential equations, including an introduction to Laplace transforms. *Prereq. EET 1152 and MTH 1195.*

4 QH**EET 1362 Basic Power Systems 1**

Focuses on power transmission lines, line constants, current voltage and power relations, electric-power distribution loads, feeders, and substations, and application of matrices. *Prereq. EET 1354.*

4 QH**EET 1363 Basic Power Systems 2**

Investigates symmetrical and asymmetrical faults, protective devices—application and coordination, power flow in electric circuits, steady-state power limitations of systems, and voltage regulation theory and application. *Prereq. EET 1362.*

4 QH**EET 1364 Basic Power Systems 3**

Offers computer applications to power systems with emphasis on load-flow studies, basic ideas of systems planning, short-circuit studies, and system stability. *Prereq. EET 1363.*

4 QH**EET 1370 Digital Computers 1**

Introduces digital computer design. Topics include general computer organization, number systems and number representations, design characteristics of major computer units, and Boolean algebra applications to computer design. *Prereq. EET 1311.*

4 QH**EET 1371 Digital Computers 2**

Examines microprocessor architecture and organization. Studies the machine language and assembly coding of an industry-accepted microprocessor, and a suitable topic from the current literature. Assembly language coding problems assigned. *Prereq. EET 1370.*

4 QH**EET 1377 Control Engineering 1**

Analyzes linear servomechanisms under both transient and steady-state conditions, signal flow graphs, and Laplace transforms in the formulation of block diagrams and transfer function. *Prereq. EET 1354 and MTH 1195.*

4 QH**EET 1378 Control Engineering 2**

Focuses on system stability, root locus techniques, and treatment of Nyquist criteria and Bode diagram methods for systems evaluation. *Prereq. EET 1377.*

4 QH

EET 1390 Optical Instrumentation**4 QH**

Focuses on telescopes, microscopes, and similar equipment, as optical system components. Includes magnification, aberrations, resolution criteria, photometry, compatibility of system components and optimization of systems, and the basic nonimage-forming systems used for analysis control and metrology. *Prereq.* MTH 1192 and PHY 1193.

EET 1399 Special Problems in Electrical Engineering Technology**4 QH**

Offers theoretical or experimental work under individual faculty supervision. *Prereq.* Permission of department chair.

General Engineering Technology

GET 1100 Computer Programming for Engineering Technology**4 QH**

Introduces computers for problem solving using C language. Topics include arrays, functions, and character manipulations. Students use the University's computer facilities to run programs. *Prereq.* MTH 1191, MTH 4107, or either taken concurrently.

GET 1105 Computer Applications for Tech**4 QH**

Studies the basics of computing in a microprocessor environment (DOS, Windows, MAC, word processing, databases, spreadsheets) with emphasis on applications relevant to technology students. Provides a solid foundation upon which students can develop more extensive computer expertise. Acquired skills are transferable to subsequent courses; cooperative education assignments; and personal and professional endeavors.

GET 1170 Engineering Graphics 1**4 QH**

Introduces manual and computer engineering drawing using geometric constructions, charts, and graphs. Geometric construction includes descriptive geometry, orthographic projection, sections, and isometric drawing.

GET 1171 Engineering Graphics 2**4 QH**

Studies computer and manual drawing in layout and assembly graphics. Topics include manufacturing processes, fasteners, gears, welding, electric/electronic drawing, architectural/structural drawing, piping, and topography. Design project required. *Prereq.* GET 1170 or equiv.

GET 1320 Engineering Ethics 1**1 QH**

Uses a case-study approach to examine basic ethical issues likely to confront engineering students on co-op and in their after-graduation professional practice. Attention is given to issues such as licensing, dissent with management, employee responsibilities, trade secrecy versus publication rights, advertising, and product liability. Discusses these issues in the context of the codes of engineering ethics of the engineering societies and general ethical theory. *Prereq.* Middler year or permission of instructor.

GET 1356 Engineering Economy**4 QH**

Presents fundamental accounting concepts and terminology, including assets, liability, net worth, and analyzing income statements and balance sheets. Discusses introductory steps in analyzing investment proposals, time value of money, and cash flows. Analyzes cash flows in terms of present worth, annual worth, rate of return, and benefit/cost ratio. Considers depreciation and tax effects on cash flows. *Prereq.* MTH 1191.

GET 1364 Kinematics**4 QH**

Studies four-bar linkages, sliders, and others, using orthogonal components of vectors, instantaneous centers, equivalent linkages, and effective cranks. Emphasizes graphic solutions and introduces the computer as a tool to enhance these concepts. Analyzes reverted and epicyclic gear trains and cam displacement. *Prereq.* GET 1171 and PHY 1191.

Mechanical Engineering Technology

MET 1301 Mechanics A**4 QH**

Explores forces, moments, couples, statics of particles, and rigid bodies in two- and three-dimensions. Examines external and internal distributed forces, first moments and centroids, and structures such as trusses, frames, and machines. *Prereq.* MTH 1193 or MTH 4120; PHY 1191 or PHY 4117.

MET 1302 Mechanics B**4 QH**

Emphasizes friction, second moments, virtual work, kinematics of particles, rectilinear and curvilinear motion of dynamic particles. Topics include force, mass and acceleration, and work and energy. *Prereq.* MET 1301 or MET 4301.

MET 1303 Mechanics C**4 QH**

Studies impulse and momentum of particles. Topics include kinematics and dynamics of rigid bodies: force, mass, and acceleration; dynamics of rigid bodies: work and energy, and impulse and momentum; and introduction to mechanical vibration. *Prereq.* MET 1302 or MET 4302.

MET 1314 Stress Analysis A**4 QH**

Investigates axially loaded members, stress and strain, allowable stresses, factor of safety, temperature effects, indeterminate members and thin-walled pressure vessels. Topics include centric loading of bolted and welded connection, shear and moment in beams, eccentrically loaded connections, and flexural and transverse shearing stresses in beams. *Prereq.* MET 1301 or MET 4301.

MET 1315 Stress Analysis B**4 QH**

Discusses determinate and indeterminate beam deflections and reactions by numerical and graphical integration and area moment methods, theorem of three moments and torsional stresses and strains. Topics include power transmission, eccentric loads on struts, beams, riveted and welded joints, combined and principle stresses, Mohr's circle, and theories of failure. *Prereq.* MET 1314 or MET 4314.

MET 1319 Mechanics**4 QH**

Introduces mechanics to nonmechanical majors. *Prereq.* MTH 1193 and PHY 1191.

MET 1330 Mechanical Design A**4 QH**

Introduces mechanical design, the design process, design factors, creativity, optimization, human factors, and value engineering. Discusses and develops principles through simple design projects. Topics include principles of design, properties and selection of materials; stress concentrations; strength under combined stresses; theories of failure; and impact, fluctuation, and repeated loads. *Prereq.* MET 1315 or MET 4315; MET 1380 or MET 4380.

MET 1331 Mechanical Design B**4 QH**

Explores stresses, deformation and design of fasteners, screws, joints, springs, and bearings, lubrication, and journal bearings. Topics include stresses and power transmission of spur, bevel, and worm gear, shaft design, and clutches and brakes. *Prereq. MET 1330 or MET 4330.*

MET 1340 Thermodynamics A**4 QH**

Introduces general theory of heat and matter, laws of thermodynamics, energy-transformation principles, availability of energy, properties and processes for pure substances and ideal gases. Topics include thermodynamic properties and processes of liquids and vapors, tables and charts, mixtures of fluids, and vapor cycles. *Prereq. PHY 1192 or PHY 4118.*

MET 1341 Thermodynamics B**4 QH**

Discusses theory of vapor engines and analysis of actual engine types using gas and vapor compression, internal combustion engines, theory of gas and vapor flow through orifices and nozzles, and principles of gas compression. Includes analysis of vapor compression, refrigeration systems, low-temperature refrigeration cycles, and absorption refrigeration systems. *Prereq. MET 1340 or MET 4340.*

MET 1342 Refrigeration and Air-Conditioning**4 QH**

Focuses on air-conditioning principles, including psychometrics and heat pumps. Examines calculation of heating and cooling loads in accordance with ASHRAE practices, principles of gas compression, analysis of vapor compression, refrigeration systems, low-temperature refrigeration cycles, and absorption refrigeration systems. *Prereq. MET 1341 or MET 4341.*

MET 1343 Heat Transfer**4 QH**

Presents the principles of heat transfer: thermal conductivity and thermal conductance/resistance. Examines heat transfer mechanisms, equations of conduction, and natural and forced convection. Studies hydrodynamic and thermal boundary layers, black body radiation, and Kirchhoff's law. Covers emissivity and absorptivity, radiation between simple bodies, heat transfer coefficients, heat changer effectiveness, and regenerative and evaporative heat exchangers. *Prereq. MET 1341.*

MET 1370 Fluid Mechanics A**4 QH**

Investigates hydrostatics, principles governing fluids at rest, pressure measurement, hydrostatic forces on submerged areas and objects, and simple dams. Topics include fluids in moving vessels, hoop tension fluid flow in pipes under pressure, fluid energy, power, and friction loss, Bernoulli's theorem, and flow measurement. *Prereq. MET 1302 or MET 4302.*

MET 1371 Fluid Mechanics B**4 QH**

Explores pipe networks and reservoir systems, flow in open channels, uniform flow, energy, friction loss, minor losses, and velocity distribution. Topics include alternate stages of flow, critical flow, nonuniform flow, accelerated and retarded flow, and hydraulic jump and waves. *Prereq. MET 1370 or MET 4370.*

MET 1380 Materials A**4 QH**

Introduces fundamental metallic structures, general metallurgical information covering theoretical aspects of properties, testing, and failure of metals. Supplemented by visual aids. Topics include alloying and hardening of metals, refinement of metals, equilibrium diagrams, characteristics of engineering metals, and principles of metal fabrication.

MET 1390 Measurement and Analysis Laboratory**2 QH**

Offers experiments for the collection and analysis of data by graphics and numerical methods including computer applications, report writing that draws conclusions relative to accuracy, precision, true values, and measured values as they relate to basic mechanical measuring instruments for length, area, volume, specific gravity, pressure, temperature, and time as these parameters are utilized in making mechanical measurements. *Prereq. GET 1100 or GET 4100; MET 1314 or MET 4314; MTH 1195 or MTH 4122; and PHY 1193 or PHY 4119.*

MET 1391 Technology Laboratory A**2 QH**

Presents experiments to determine mechanical properties of materials under tensile, compressive, torsional, direct shear, flexural, impact, fatigue, and creep loading conditions as they are affected by normal and abnormal environmental conditions; also as they are affected by homogeneity, nonhomogeneity, isotropy, and nonisotropy. *Prereq. MET 1315 or MET 4315; MET 1380 or MET 4380; MET 1390 or MET 4390; or taken concurrently.*

MET 1392 Technology Laboratory B**2 QH**

Offers experiments to determine the physical properties of incompressible fluids and to measure the flow rates and velocities utilizing pilot tubes, orifice plates, ventururi and weirs flow meters, U-tube differential manometers, and piezometers as the fluid flows through open channels, partially filled conduits, conduits under pressure, pipe networks, turbines and pumps. *Prereq. MET 1390 or MET 4390; MET 1370 or MET 4370; or taken concurrently.*

MET 1393 Technology Laboratory C**2 QH**

Explores basic thermodynamic relations. Experiments examine the flow of compressible fluids and steam and the energy conversion of a fuel into a working substance and the related heat-transfer mechanisms. Discusses operating characteristics of thermal generators, engines, and compressors. *Prereq. MET 1390 or MET 4390; MET 1341 or MET 4341; or taken concurrently.*

MET 1394 Technology Laboratory D**2 QH**

Presents experiments to examine the operating characteristics and efficiencies of internal combustion engines, brake horsepower, indicated horsepower, friction horsepower, and mean effective pressure. Topics include fuel consumption, torque, ignition timing, manifold pressure, and compression ratios and internal engines as energy conversion systems, and energy conversion of fuels. *Prereq. MET 1341 or MET 4341; MET 1343 or MET 4343; MET 1393 or MET 4393; or taken concurrently.*

MET 1395 Technology Laboratory E**2 QH**

Offers experiment, analytical, and design projects to examine refrigeration, air conditioning, and heating pump cycles. *Prereq. MET 1342 or MET 4342; MET 1343 or MET 4343; and MET 1390 or MET 4390.*

MET 1396 Machine Shop**4 QH**

Introduces the study of machines for metal processing, cutting tools, and fluids, machinability, and automatic machinery.

MET 1414 Mechanical Vibrations**4 QH**

Examines elements of vibrating systems, one degree of freedom (undamped free and forced vibration from Newton's law of motion and energy methods), natural frequencies, and damped free and forced vibration. Topics include impedance and mobility,

systems with more than one degree of freedom; influence coefficients, Lagrange's equations, generalized coordinates, and vibration absorber. *Prereq.* MET 1303 or MET 4303.

MET 1415 Experimental Stress Analysis

4 QH

Explores theory and experimentation showing the application of extensometers and electrical strain gauges as transducers in the field of experimental stress and strain analysis. Presents theory and lab practice on photoelastic methods as applied to classical model analysis and modern coating analysis. *Prereq.* MET 1315 or MET 4315.

MET 1416 Stress Analysis C

4 QH

Discusses curved beam, asymmetrical bending of beams, shear-center and shear stresses on thin sections, composite beams; columns energy absorption and resilience, inertial stresses, impact loading, and deflection of beams by energy methods and bolted fastenings. *Prereq.* MET 1315 or MET 4315.

MET 1444 Power Generation

4 QH

Explores electrical power generation by thermomechanical, electromechanical, nuclear, and hydraulic systems. Analyzes thermodynamic cycles as well as practical deviations from the related ideal processes. Considers accessory and auxiliary equipment use. Studies design, performance, economic factors, and public issues affecting electrical power generation. *Prereq.* MET 1341.

MET 1481 Materials B

4 QH

Focuses on the study of inorganic materials (polymers, glasses, ceramics, cements, wood), and materials having important electrical and magnetic properties. A summary of the most recent applications for the fabrication and uses of both metals and nonmetals. Structures of metals, imperfections, phase diagrams effect of temperature on structure and properties of metals (annealing, recrystallization, recovery, precipitation, diffusion) strengthening mechanisms, mechanical properties of nonferrous metals. Lab experiments in preparation of samples, selection, polishing, and etching; examination of nonferrous metals, use of the microscope, linear analysis construction of cooling curves, and simple binary-phase diagrams. *Prereq.* MET 1380 or MET 4380.

MET 1499 Special Problems in Mechanical Engineering Technology

4 QH

Theoretical or experimental work under individual faculty supervision. *Prereq.* Permission of department chair.

Nursing

NUR 1100 Introduction to Professional Nursing and the Health System 4 QH

Surveys the social, political, and economic forces that influence the nursing profession. Considers the historical development of nursing and its role and contribution to American society. Introduces the United States health sector and the social, political, and economic factors that affect health-care delivery. Views concepts of health and illness from their meanings to the general population. Encourages students to explore individual goals in the nursing profession.

NUR 1101 Introduction to the Theoretical Basis for Nursing Practice 4 QH

Introduces general concepts in professional nursing and in the nursing paradigm. Continues health, wellness, and illness issues introduced in NUR 1100. Explores the concepts of nursing process, teaching, learning, client, and adapting. Introduces observation, interview, and basic measurements as methods of collecting data in the assessment phase of the nursing process. Explores communication as an essential aspect of professional role behavior. Gives students the opportunity to practice interview and basic measurements. *Prereq.* NUR 1100 or permission of instructor.

NUR 1102 Introduction to Human Nutrition 4 QH

Explores the fundamental role of nutrition in promoting health. Studies the physiological functions of nutrients, their food sources, and recommended intakes for different age groups. Utilizes principles from the humanities and sciences in developing nutrition concepts. Introduces the use of different diet-assessment tools to assist individuals in meeting nutrient and energy needs. Encourages students to examine their own food choices and how those choices translate into meeting recommended nutrient and energy needs. Discusses the origins of food habits and the relevance of nutrition counseling and education in nursing practice. *Prereq.* NUR 1100 or permission of instructor.

NUR 1200 Nursing Basic Human Needs 1 6 QH

Gives the opportunity to explore the professional role in a clinical setting. Builds on knowledge of the Roy Adaptation Model; allows students to implement the nursing process in the four adaptive modes and also focus on psychomotor development skills. Offers students the chance to provide basic nursing care to selected clients. Through lectures and assignments, helps students utilize and explain scientific and conceptual bases for nursing activities. Explores professional responsibility in a legal and ethical framework with specific attention to the students' individual role development. *Prereq.* BIO 1115, BIO 1152, BIO 1153, CHM 1111, CHM 1112, NUR 1100, NUR 1101, NUR 1102, and sophomore standing.

NUR 1201 Nursing Basic Human Needs 2 6 QH

Allows students to continue developing in the professional role in a clinical setting. Emphasizes physical assessment and patient education. Offers students the chance to provide basic nursing care and to continue to strengthen their understanding of the nursing process by using the Roy Adaptation Model. Through lectures and assignments, helps students expand their scientific and conceptual basis for nursing activities. *Prereq.* BIO 1120, BIO 1154, NUR 1200, and sophomore standing.

NUR 1202 Introduction to Pathophysiological Concepts for Clinical Nursing 4 QH

Focuses on Roy's Physiological Mode. Covers oxygenation, nutrition, elimination, protective mechanisms, activity/neurological

functions, endocrine/regulator functions, and skin integrity.

Explores how the human body uses its adaptive powers to maintain a steady state and how alterations disrupt normal processes. Reviews disease processes and implications for nursing practice. *Prereq.* BIO 1115, BIO 1120, BIO 1152, BIO 1153, BIO 1154, and sophomore standing.

NUR 1300 Nursing Common Problems

7 QH

Focuses on specific physiologic alterations in adult health and on corresponding psychosocial adaptations in client and families. Employs Roy's Adaptation Model and addresses the adaptive behaviors in its four modes. Emphasizes the physiologic mode as the client moves along the illness/wellness continuum. Allows students to assess, plan, implement, and evaluate nursing care for selected adult clients under faculty guidance in the acute clinical setting. Gives students the opportunity to administer nursing care, collaborating with faculty, clients, primary nurses, and other appropriate health team members in the clinical practicum. *Prereq.* BIO 1254, NUR 1201, NUR 1202, PSY 1112, and middle standing.

NUR 1301 Psychiatric/Mental Health Nursing

7 QH

Examines the process used by the professional nurse in facilitating the adaptive responses and goal attainment of human systems. Specifically, focuses on the study of self-concept, role functioning, and interdependence among individuals, families, and groups. Studies the interpersonal process of professional nursing and how the nurse works with client systems in their striving toward survival, growth, reproduction, and mastery. Discusses how within this process, adaptive responses are enhanced and ineffective responses are altered. Uses the Roy Adaptation Model as the framework. *Prereq.* BIO 1254, NUR 1201, PSY 1112, and middle standing.

NUR 1302 Transition

9 QH

Introduces registered nurse students to the purposes, philosophy, and conceptual framework of the baccalaureate degree program. Provides students with the opportunity to complement and validate, through guided study, knowledge of professional roles and role conflicts, communication and group process, and principles of teaching, learning, and evaluation. Uses the Roy Adaptation Model in designing and providing nursing care, specifically with aging, chronically ill, and dying patients. Also discusses nutritional needs, with specific emphasis on aged, acute, and chronically ill clients. *Prereq.* BIO 1120, BIO 1140, BIO 1141, BIO 1253, BIO 1255, CHM 1111, CHM 1112, PSY 1111, PSY 1112, and registered nurse license.

NUR 1303 Life Crises: Analysis and Response

4 QH

Considers personal, family, and community crises identified from literature, health agency clientele, and student sources. Uses concepts from nursing, sociology, anthropology, and social psychology to assess critically the individual's experience of crisis and the approaches used by providers in human-service systems to help people in crisis. Gives students in consumer and/or health and human service roles the opportunity to critically examine the meaning of life crises in a social-cultural vs. psychopathological framework and to explore principles and creative strategies that might be used in responding constructively to crises in their own lives or in their experience as health or human-service workers. *Prereq.* Middle standing in nursing, criminal justice, applied social science, or the health professions.

NUR 1304 Independent Study Elective**2 QH**

Allows students to pursue a topic more intensely than in regular coursework. Students contract with a faculty member whose background, interests, and time allow direction of in-depth study. Student and faculty member jointly develop course objectives. *Prereq.* NUR 1201.

NUR 1400 Maternal and Child Nursing**9 QH**

Focuses on applying the Roy Adaptation Model in maintaining optimal health for child-bearing and child-rearing families. Using the four modes of the model, the student examines individuals and families at selected developmental stages. Presents theoretical content in four units, with the first two focusing on adaptive behaviors and the second two examining ineffective behaviors. Gives students the opportunity to assist clients in selected maternity and child-care settings in coping with the stress and stimuli that interfere with the adaptation process. *Prereq.* NUR 1300, NUR 1301, PCL 1305, PSY 1241, PSY 1242, and junior standing.

NUR 1401 Medical-Surgical Nursing**9 QH**

Focuses on the effects of episodes of acute illness on individuals, families, and community. Addresses the four modes of the Roy Adaptation Model. Emphasizes the alterations and adaptations in physiology characteristic of acute episodes of illness and the nurse's role in intervention. Also discusses the impact of illness on patterns of living, the needs for health teaching, and continuity of care. Provides guided clinical experiences, emphasizing the nursing process and the skills necessary to plan and implement care for adults in an acute-care setting. *Prereq.* NUR 1300, NUR 1301, PCL 1305, PSY 1241, PSY 1242, and junior standing.

NUR 1402 Health Assessment**4 QH**

Provides the student with additional theory and skills relevant to the clinical decision-making role of the nurse as a primary caretaker. Extends the student's knowledge and experience of history-taking and physical and psychosocial assessment. Emphasizes analysis and synthesis of data obtained from a holistic health assessment as an essential framework for the identification of common health abnormalities and the enhancement of the nurse's clinical decision-making skills. *Prereq.* NUR 1300, NUR 1301, or NUR 1302. *Open to upper-division students in nursing.*

NUR 1404 The Nurse Entrepreneur**4 QH**

Focuses on the role of the nurse as an entrepreneur. Within the generic functions of nursing, studies situations of patient family teaching that provide the framework for introducing students to the essentials of undertaking this function as a business venture. Includes the formation of a nurse entrepreneur's venture action plan to do patient and family teaching. *Open to middler students in nursing.*

NUR 1500 Community Health Nursing**9 QH**

Focuses on the use of the nursing process to promote the adaptation of individuals, families, groups, and communities. Examines utilization of the Roy Adaptation Model in addressing client needs. Analyzes the interrelationship of client and environmental factors as they relate to the attainment of health goals. Discusses the influence of the role of the community health nurse and cultural, political, socioeconomic, and epidemiological factors on client adaptation. *Prereq.* NUR 1400, NUR 1401, PSY 1242, SOA 1100, and senior standing.

NUR 1504 Contemporary Issues in Nursing**2 QH**

Analyzes sociological, political, legal, economic, ethical, historical, and ideological factors affecting contemporary nursing practice and the health-care system. Synthesizes professional role issues. *Prereq.* NUR 1400, NUR 1401, SOA 1100, and senior standing or permission of instructor.

NUR 1502 Introduction to Research in Nursing**4 QH**

Builds on students' prior exposure to select studies applied to nursing. Discusses and critiques qualitative and quantitative research and the value of each to the practice of nursing and to the health-care field. Examines the importance of research in nursing to both practitioner and consumer. *Prereq.* NUR 1400, NUR 1401, SOA 1100, and senior standing or permission of instructor.

NUR 1503 Advanced Clinical Care**4 QH**

Builds on students' clinical nursing experiences. Focuses on analyzing, synthesizing, and prioritizing solutions to patients' problems, using the case study format. Applies concepts of pathophysiology, nutrition, pharmacotherapeutics, stress, and crisis to acutely ill clients in case simulations. Develops clinical nursing judgment with acutely ill patients in adult, maternal, and child populations. *Prereq.* NUR 1400, NUR 1401, and senior standing.

NUR 1505 Introduction to Leadership and Management of Patient Care**3 QH**

Focuses on the nurse as a leader and manager of patient care. Examines the theoretical base for organizing and facilitating the delivery of efficient and appropriate nursing services to clients and patients across various settings. Explores concepts from nursing, organizational theory, decision-making theory, and leadership and management theory to heighten the nurse's awareness of the human and material resources required to deliver nursing care. Emphasizes the importance of collaborating with a variety of providers. *Prereq.* NUR 1400, NUR 1401, and senior standing.

NUR 1506 Senior Clinical Elective**6 QH**

Provides a transition for senior students as they enter their professional clinical practice. Requires two components, a precepted clinical practicum and a clinical seminar. Assigns each student to a clinical agency according to her/his identified objectives and a faculty assessment of the student's clinical knowledge and skills needs. The student will practice two days per week for one quarter following the preceptor's schedule in the selected clinical site. Encourages students to incorporate off-shift and weekend assignments as is appropriate for the agency. A concurrent clinical seminar, held once a week for two hours and guided by a College of Nursing faculty member, focuses on critical thinking and clinical decision making. *Prereq.* NUR 1500 and senior standing.

NUR 1600 International Health Care Practices**4 QH**

Introduces the student to the ways in which people in developing nations take care of their health. Considers the cultural context of health care practices, viewed within the framework of what people believe about themselves and the world around them; the relationship of individual and cultural belief systems; the role religious and spiritual beliefs play in protection, care, and curing; ideas about food and its relationship to health; the concepts of health education in a belief system; and the ethical issues of health care and resource allocation. *Open to any undergraduate student.*

NUR 1601 International Health Care Delivery Systems**4 QH**

Provides students with an opportunity to learn about health care delivery systems in other countries. Introduces the student to a framework from which to study any health care delivery system. Includes an overview of health care delivery from a variety of perspectives. Investigates the divergence between two third world and developed nations' health care delivery systems. Students study a selected country's health care delivery system in depth. *Open to any undergraduate student.*

NUR 1602 International Health Policy Issues**4 QH**

Presents a critical approach to selected issues in contemporary international health policy. Includes the socioeconomic context in which such policy arises, the endogenous and exogenous factors that shape it, and the strategies that govern its implementation. Examines policies related to a selected issue, such as food and agriculture, in some depth as a model for the conceptual approach to understanding health policy issues. *Open to any undergraduate student.*

NUR 1606 Women's Health Choices and Decisions**4 QH**

Explores personal health and safety concerns specific to women from menarche to mid-life. By examining personal experiences, students develop their knowledge base and self-awareness; a goal is to empower students to take charge of their health. Seminars investigate self-promotion of health; how to be a knowledgeable consumer; when and how to choose a provider; and care options for fertility regulation, infertility, pregnancy, childbirth, and other conditions specific to women. *Open to any undergraduate student.*

Pharmacy and Health Sciences

Athletic Training

ATP 1000 Introduction to Athletic Training 3 QH
Exposes students to the profession. Introduces basic injury prevention and first aid techniques.

ATP 1100 Prevention and Care of Athletic Injuries 3 QH
Examines the principles in prevention, recognition, management, and rehabilitation of athletic injuries. Focuses on physiological and pathological nature of the injury and discusses the course of action for return to competition. *Prereq.* ATP 1000. *Formerly* HSL 1605.

ATP 1101 Athletic Training Laboratory 1 QH
Discusses the biomechanical and anatomical principles as well as indications and contraindications of the various wrapping and strapping techniques used for athletic injuries. Presents the indications for use and types of protective devices such as braces and splints. Utilizes lab time for applying and developing skills. *Formerly* HSL 1268.

ATP 1110 Fundamentals of Athletic Training 3 QH
Presents the duties and functions of the certified athletic trainer, emphasizing how to prevent and evaluate athletic injuries. Focuses on the athletic trainer's relationship to other allied medical professions. *Formerly* HSL 1605.

ATP 1200 Clinical Athletic Training 4 QH
Introduces the student athletic trainer to the clinical experience. Gives an opportunity to practice the various skills essential for evaluating, treating, and rehabilitating athletic injuries. *Prereq.* ATP 1100 and ATP 1101. *Formerly* HSL 1608.

ATP 1300 Advanced Athletic Training I 4 QH
Focuses on the evaluating and predisposing conditions of heat illness, head and neck trauma, and lower extremity athletic injuries. *Prereq.* ATP 1100 and ATP 1200. *Formerly* HSL 1609.

ATP 1350 Advanced Athletic Training 2 4 QH
Continues ATP 1300. Focuses on evaluating athletic injuries of the upper extremity, torso, and lower back. Covers how to identify injury and illness of the internal organs. *Prereq.* ATP 1100 and ATP 1300. *Formerly* HSL 1628.

ATP 1390 Athletic Training Practicum 1 3 QH
Offers assignments in field settings related to students' areas of study. Gives students the opportunity to observe and perform professional skills under a certified athletic trainer's supervision. *Prereq.* ATP 1100 and ATP 1200. *Formerly* HSL 1790.

ATP 1400 Therapeutic Modalities in Athletic Training 4 QH
Presents the physical agents used in athletic training with regard to their physiologic effects. Discusses where in the healing process these agents may be used and their theoretical implications. *Prereq.* ATP 1100 and ATP 1200. *Formerly* HSL 1627.

ATP 1490 Athletic Training Practicum 2 3 QH
Same as ATP 1700. *Formerly* HSL 1791.

ATP 1500 Therapeutic Reconditioning 4 QH
Covers principles and objectives inherent in rehabilitating athletic injuries. Discusses orthopedic rehabilitation fundamentals, as well as specific conditioning and reconditioning techniques. Exposes the student to the different types of exercise and equipment used in rehabilitation. Provides laboratory experiences in applying rehabilitation programs using equipment. *Prereq.* ATP 1200 and ATP 1300. *Formerly* HSL 1626.

ATP 1590 Athletic Training Practicum 3 3 QH
Same as ATP 1700. *Formerly* HSL 1792.

ATP 1600 Organization and Administration of Athletic Training Programs 4 QH
Provides students with the knowledge and skills necessary to manage an athletic training facility. Includes topics such as budgeting, facility design, physical examinations, and staffing. *Prereq.* ATP 1100, ATP 1200, and ATP 1300. *Formerly* HSL 1629.

ATP 1690 Athletic Training Practicum 4 3 QH
Same as ATP 1700. *Formerly* HSL 1793.

ATP 1800 Senior Seminar 4 QH
Discusses current topics pertaining to the fields of athletic training and sports medicine. *Prereq.* Senior standing in the athletic training major.

Cardiopulmonary Sciences

CPS 1111 Cardiopulmonary Sciences Seminar 1 1 QH
Introduces the beginning cardiopulmonary sciences student to the various areas of study within the major. Examines the role of each profession in health care delivery. Field trips give students the opportunity to observe professionals in their specific roles. *Formerly* RTH 1111.

CPS 1112 Cardiopulmonary Sciences Seminar 2 1 QH
Continues CPS 1111. *Formerly* RTH 1112.

CPS 1113 Cardiopulmonary Sciences Seminar 3 1 QH
Continues CPS 1112. *Formerly* RTH 1113.

CPS 1114 Basic Life Support 1 QH
Covers what CPR is, how it works, when CPR should be started, and when it should be stopped. Other topics include basic anatomy and physiology, prudent heart living, signals of heart attack, actions for survival, and medicolegal considerations. Teaches the technical aspects of cardiopulmonary resuscitation and foreign body airway obstruction. Three hours of lectures will be followed by three three-hour demonstration/practice/evaluation laboratory sessions. Students successfully completing written and manikin evaluations will be issued American Heart Association BLS Healthcare Provider cards. *Enrollment is limited and preference will be given to Cardiopulmonary Science majors.*

CPS 1211 Practicum in Respiratory Care 4 QH
Provides clinical experience in hospitals. The first course in a sequence of five. Focuses on respiratory care for noncritical patients. Emphasizes infection control, medical gas administration, humidification of medical gases, aerosol therapy, chest

physiotherapy, deep breathing treatments, and the administration of aerosol medications. *Prereq.* CPS 1331, CPS 1301, CPS 1332 concurrently, and CPS 1302 concurrently. *Formerly* RTH 1211.

CPS 1301 Professional Practice Laboratory 1 1 QH
Provides practice in basic care skills through laboratory exercises and simulation of patient-care situations. Lab fee. *Prereq.* CPS 1331 concurrently. *Formerly* RTH 1301.

CPS 1302 Professional Practice Laboratory 2 1 QH
Provides students with hands-on experience in working with respiratory therapy equipment. Sets up simulated patient-management problems in the lab to provide problem-solving experience. Lab fee. *Prereq.* CPS 1301, and CPS 1332 concurrently. *Formerly* RTH 1302.

CPS 1312 Practicum in Respiratory Care 4 QH
Focuses on treating patients with more complex cardiorespiratory disorders. The second course in a sequence of five directly related to the clinical practice of various modalities of respiratory care. *Prereq.* CPS 1332, CPS 1302, CPS 1433 concurrently, and CPS 1403. *Formerly* RTH 1312.

CPS 1313 Practicum in Respiratory Care 6 QH
Provides clinical experience in hospitals. Emphasizes respiratory care for critical patients. Reviews advanced respiratory-care topics such as airway care, mechanical ventilation, and positive end expiratory pressure. *Prereq.* CPS 1433, CPS 1302, CPS 1434 concurrently, CPS 1404 concurrently. *Formerly* RTH 1313.

CPS 1320 Cardiopulmonary Physiology 4 QH
Provides detailed information relating to cardiopulmonary physiology in the normal, diseased, and stressed state. Discusses the mechanics of regulatory control and interaction between the cardiovascular and respiratory systems. *Formerly* RTH 1320.

CPS 1321 Cardiopulmonary Disease 4 QH
Introduces clinical diagnostic procedures employed in evaluating cardiopulmonary patients and description of the etiology, pathophysiology, diagnosis, and treatment of major cardiopulmonary diseases. *Prereq.* Satisfactory completion of the first-year courses. *Formerly* RTH 1321.

CPS 1331 Introduction to Patient Care 4 QH
Provides an opportunity for the student to gain knowledge and understanding of basic patient-care skills, including moving and positioning of patients, infection control, basic observation and assessment skills, and familiarity with the techniques of cardiopulmonary resuscitation. Also provides an opportunity for the development of the student's interpersonal and communication skills. *Formerly* RTH 1331.

CPS 1332 Introduction to Respiratory Care 4 QH
Focuses on the theory and application of medical gas administration and humidity/aerosol therapy. Basic to all other professional respiratory therapy courses. *Prereq.* CPS 1331 and PCL 1309 concurrently. *Formerly* RTH 1332.

CPS 1403 Professional Practice Laboratory 3 1 QH
Provides students with hands-on experience with respiratory therapy procedures. Sets up simulated patient-management problems in the lab to provide problem-solving experience. Lab fee. *Prereq.* CPS 1302, and CPS 1433 concurrently. *Formerly* RTH 1403.

CPS 1404 Professional Practice Laboratory 4 1 QH
Provides students with an opportunity to acquire experience in working with respiratory therapy life support equipment. Sets up simulated critical-care problems in the lab to provide problem-solving experience. Lab fee. *Prereq.* CPS 1403, and CPS 1434 concurrently. *Formerly* RTH 1404.

CPS 1408 Research Design 4 QH
Introduces research methodology and scientific writing. Reviews the literature on topics related to the cardiopulmonary sciences. Emphasizes analyzing data and critiquing written research. *Prereq.* Statistics elective. *Formerly* HSL 1408.

CPS 1414 Clinical Seminar 1 1 QH
Discusses clinical topics and respiratory-care problems encountered during clinical practice in the hospitals. *Prereq.* CPS 1312 concurrently. *Formerly* RTH 1414.

CPS 1415 Clinical Seminar 2 1 QH
Discusses clinical topics and critical-care problems encountered during clinical practice in the hospital. *Prereq.* CPS 1313 concurrently. *Formerly* RTH 1415.

CPS 1433 Respiratory Care for the Medical and Surgical Patient 4 QH
Continues the introduction to respiratory therapy, as the didactic portion of beginning clinical experience on noncritical patients. Focuses on respiratory-care problems following major surgery and those problems related to medical patients. *Prereq.* CPS 1332. *Formerly* RTH 1433.

CPS 1434 Respiratory Care for the Critical Patient 4 QH
Focuses on respiratory-care problems encountered with patients in intensive care units. The last in a sequence of three directly related to the theory of respiratory therapy procedures; designed as the didactic portion of clinical experience on critical patients. *Prereq.* CPS 1433. *Formerly* RTH 1434.

CPS 1435 Introduction to Perinatal/Pediatric Respiratory Care 2 QH
Provides the student with the opportunity to acquire knowledge and understanding of human cardiopulmonary development from the time of conception through childhood years. Emphasizes normal as well as abnormal manifestations of pregnancy, labor, and the process of delivering. Examines methods and techniques of assessment and delivery of respiratory care related to the pediatric patient's pathophysiology of cardiopulmonary disease. *Prereq.* CPS 1434. *Formerly* RTH 1435.

CPS 1505 Cardiopulmonary Laboratory Practice 1 QH
Focuses on the techniques of pulmonary functions testing, blood gas analysis, and cardiovascular testing commonly done in the clinical setting. The lab portion of Cardiopulmonary Laboratory Technology. Lab fee. *Prereq.* CPS 1535 concurrently. *Formerly* RTH 1505.

CPS 1510 Perfusion Technology Practicum 1 6 QH
Provides perfusion technology students with the opportunity to develop, practice, and master skills required to perform extra-corporeal circulation procedures. Also includes, but is not limited to, current methods in autotransfusion, myocardial preservation, and intra-aortic balloon support. *Prereq.* CPS 1570. *Formerly* RTH 1510.

- CPS 1511 Practicum in Critical Care 1** 4 QH
Allows the student to select an area of emphasis from among the following: intensive care units, neonatal-pediatrics, or extracorporeal membrane oxygenation. During the practicum courses, provides students with an opportunity to work in their specialty areas. *Prereq.* CPS 1574 and CPS 1578. *Formerly* RTH 1511.
- CPS 1512 Practicum in Critical Care 2** 4 QH
Continues CPS 1511. *Prereq.* CPS 1511. *Formerly* RTH 1512.
- CPS 1515 Perfusion Technology Practicum 2** 6 QH
Continues CPS 1510. *Prereq.* CPS 1514, CPS 1571, and CPS 1572. *Formerly* RTH 1515.
- CPS 1516 Advanced Clinical Seminar 1** 1 QH
Complements CPS 1571. Discusses current clinical problems related to life-support systems problems encountered in the hospital. *Prereq.* CPS 1571 concurrently. *Formerly* RTH 1516.
- CPS 1517 Advanced Clinical Seminar 2** 1 QH
Complements a professional elective taken concurrently. Discusses current clinical problems and research related to problems encountered in the hospital. *Prereq.* CPS 1572 concurrently. *Formerly* RTH 1517.
- CPS 1518 Advanced Clinical Seminar 3** 1 QH
Complements CPS 1511. Discusses current clinical problems and emphasizes research related to critical-care problems. *Prereq.* CPS 1511 concurrently. *Formerly* RTH 1518.
- CPS 1519 Advanced Clinical Seminar 4** 1 QH
Continues CPS 1518. Complements CPS 1512. *Prereq.* CPS 1512 concurrently. *Formerly* RTH 1519.
- CPS 1570 Fundamentals of Perfusion Technology** 4 QH
Applies biologic, pharmacologic, and physical principles to extracorporeal cardiopulmonary support. Focuses on the basic theory and instrumentation of perfusion technology, emphasizing circuit design and function, oxygenator theory, pump dynamics, blood recovery and autotransfusion procedures, myocardial protection techniques, intraaortic counterpulsation, aseptic techniques, and surgical procedures. Provides an opportunity to work with perfusion equipment and to develop the psychomotor skills necessary to implement perfusion procedures. Lab. *Formerly* RTH 1570.
- CPS 1571 Advanced Life Support Systems 1** 4 QH
Introduces students to selected techniques of advanced life support applied to the critically ill patient. *Prereq.* CPS 1434. *Formerly* RTH 1571.
- CPS 1572 Perfusion Technology** 4 QH
Introduces students specializing in perfusion technology to the theory, principles, and concepts of cardiovascular perfusion. *Prereq.* CPS 1571. *Formerly* RTH 1572.
- CPS 1573 Cardiopulmonary Laboratory Techniques** 4 QH
Provides the student with an opportunity to gain knowledge and background in principles, theory, and procedures encountered in a clinical cardiopulmonary lab. Focuses on the physiological foundations of cardiopulmonary testing. *Prereq.* CPS 1321 and permission of instructor. *Formerly* RTH 1535.
- CPS 1574 Advanced Clinical Physiology** 4 QH
Provides respiratory therapy students with an opportunity for an in-depth exposure to medical physiology, based on the concept of the homeostatic state and its application to the clinical setting. *Prereq.* PAH 1204 and permission of instructor. *Formerly* RTH 1574.
- CPS 1576 Neonatal Respiratory Care** 4 QH
Provides the student with an understanding of the methods and techniques of respiratory therapy for neonatal patients. Emphasizes mechanical ventilation, newborn care, and the respiratory distress syndrome. *Prereq.* CPS 1574. *Formerly* RTH 1576.
- CPS 1578 Advanced Medical Monitoring** 4 QH
Provides students with an opportunity for an in-depth exposure to the theory and application of physiologic monitoring systems and their use in critical-care settings. *Prereq.* CPS 1574. *Formerly* RTH 1578.
- CPS 1612 Exercise Physiology 1** 4 QH
Studies the immediate and long-range effects of exercise on the human body, emphasizing the cardiovascular and respiratory systems, muscles, and metabolism. Includes physical fitness, body composition, and selected components of motor performance. Covers assessment techniques and training principles. Introduces indirect open-circuit calorimetry and EKG monitoring. *Formerly* HSL 1612.
- CPS 1613 Laboratory in Exercise Testing and Prescription** 4 QH
Presents a practicum in assessing cardiovascular function, muscular strength, muscular endurance, flexibility, and body composition. Gives students the opportunity to prescribe exercise programs through volunteer work as exercise test technicians and exercise leaders in fitness classes. *Prereq.* CPS 1612. *Formerly* HSL 1613.
- CPS 1614 Electrocardiography** 4 QH
Studies basic and intermediate electrocardiography, including cardiac function, lead systems, rate, rhythm, axis, infarction, ischemia, hypertrophy, effects of cardiovascular drugs, and effects of exercise. *Prereq.* CPS 1613. *Formerly* HSL 1614.
- CPS 1617 Programming for Cardiovascular Health & Exercise** 4 QH
Focuses on the design, delivery, and evaluation of fitness and wellness programs to individuals and groups in a corporate, commercial, or a clinical setting. *Prereq.* CPS 1612 and HSL 1282.
- CPS 1632 Health Science Education** 4 QH
Studies the systems approach to teaching health science. Covers developing instructional goals based on needs assessments, behavioral learning objectives, instructional strategies, and evaluation instruments. Emphasizes using criterion-referenced measurement strategies to evaluate mastery of clinical skills.
- CPS 1633 Student Teaching and Seminar** 4 QH
Involves part-time participation (twelve hours per week) in a supervised learning experience that provides practice with didactic, laboratory, or clinical teaching. Gives students an opportunity to demonstrate, evaluate, and develop their teaching skills. Discusses problems encountered in the classroom, laboratory or hospital through one-hour weekly seminars. *Formerly* RTH 1633.

CPS 1634 Rehabilitation of Patients with Respiratory Disorders 4 QH
Applies a broad definition of rehabilitation to the life situations of patients with respiratory disorders. Gives students the opportunity to learn specific skills that address the recognition and management of acute and chronic problems. Develops model systems of psychosocial as well as physical support based on these skills. Open to students in health or human service disciplines who have had clinical or field experience. *Formerly RTH 1634.*

CPS 1635 Practicum in Pediatric Pulmonary Rehabilitation 1 QH
Involves counselorship under medical direction at a one-week summer camp for children with severe pulmonary disorders. Requires students to apply skills acquired in CPS 1634 in residential camp situation and to respond to medical or psychosocial problems in a manner consistent with current methods in his/her discipline. Involves group and individual discussions with the instructor to clarify insights and experiences. Requires daily case reports to document the learning process. *Prereq. CPS 1634 or permission of instructor; enrollment limited. Formerly RTH 1635.*

CPS 1641 Fundamentals of Cardiac Catheterization 4 QH
Covers cardiovascular technology and basic concepts such as medical aseptic technique. Introduces concepts related to cardiac output studies, shunt determinations, and electrophysiology. Examines the fundamental principles of intracardiac waveforms and cardiac catheterization. *Formerly RTH 1641.*

CPS 1801 Directed Independent Study 1 2 QH
Offers directed study in a student's major wherein in-depth investigation of a special interest area is undertaken. *Prereq. CPS 1511 concurrently. Formerly RTH 1801.*

CPS 1802 Directed Independent Study 2 2 QH
Offers directed study in a student's major wherein in-depth investigation of a special interest area is undertaken. *Prereq. CPS 1512 concurrently. Formerly RTH 1802.*

CPS 1810 Continuation of Clinical 0 QH
Provides perfusion technology students with the opportunity to clear grades of I (Incomplete) in CPS 1515, Practicum in Perfusion Technology 2. At the end of the six-week period, students will be reevaluated using the criteria developed for CPS 1515, and I grades will be changed to the grades earned at that time. *Formerly RTH 1810.*

CPS 1820 Internship in Cardiovascular Health and Exercise 12 QH
Provides commercial, corporate, or clinical experience in exercise testing, exercise prescription and leadership, and client education and counseling in a supervised setting. Students must successfully complete 360 hours of internship experience in addition to other written assignments. *Prereq. Completion of quarter 9 in the cardiovascular health and exercise curriculum. Formerly HSL 1800/1801.*

CPS 1821 Minor Internship in Cardiovascular Health and Exercise 6 QH
Provides commercial, corporate, or clinical experience in exercise testing, exercise prescription and leadership, and client education and counseling in a supervised setting for students minoring in cardiovascular health and exercise. Students must successfully complete 200 hours of internship experience in addition to other written assignments. *Prereq. HSL 1612, HSL 1613, and HSL 1614. Formerly HSL 1801.*

CPS 1866 Special Problems 4 QH
Discusses current issues and concepts in cardiovascular health and exercise. Requires an independent research paper. *Prereq. Junior and senior cardiovascular health and exercise majors. Formerly HSL 1866.*

Counseling Psychology, Rehabilitation, and Special Education

CRS 1200 Introduction to Special Education 4 QH
Surveys the characteristics and the social, emotional, and educational adjustment of individuals with special needs. Evaluates the effects of societal attitudes and perceptions on individuals with special needs in a variety of settings. Reviews legislation and current trends, with an emphasis on integration and full inclusion of individuals with special needs in regular education settings and also in the community.

CRS 1314 Introduction to Counseling 4 QH
Surveys major theoretical approaches to counseling. Provides training and practice in listening skills to aid in the development of facilitative responses. Combines didactic presentations and experiential activities to assist students in understanding and implementing a variety of counseling approaches.

CRS 1315 Introduction to Etiology and Development of Special Needs 4 QH
Presents an overview of the etiology and development of disabling conditions, current issues in these areas, problems associated with drug and substance abuse and other high risk factors, and curriculum strategies for dealing with early childhood, elementary, and middle school children with special needs conditions. Requires students to develop a report and research paper on the etiology of a specific disabling condition.

CRS 1316 Introduction to Assessment, Program Planning, and Implementation in Special Education 4 QH
Presents an overview of the federal and state laws pertaining to assessment in special education, and an overview of the theories and strategies for integrating children with mild and moderate special needs. Requires students to administer three education assessments, summarize the results in a case report, propose a program of education intervention, and identify methods to facilitate and monitor its implementation.

CRS 1317 Student Teaching and Seminar in Special Education 8 QH
Allows for full-time participation in a University-arranged and supervised school program. Gives the student the opportunity to analyze the teaching of and the learning by special-needs students and to demonstrate, evaluate, and develop teaching skills in a variety of classroom settings. *Prereq. Advanced professional sequence with minimum 2.0 QPA both overall and in teaching major.*

CRS 1500 Mental Health 4 QH
Investigates emotional health and well-being as they relate to total health, with emphasis on factors that influence emotional behavior. Includes various approaches to emotional health in school programs and the community.

CRS 1503 Human Sexuality and Family Dynamics 4 QH
Examines sexuality from a physical, psychological, social, historical, and cultural perspective. Considers sexual needs and concerns about sexuality at various stages in life, including a variety of approaches to sex education in schools, community, and the family. *Prereq. Middler standing or above.*

CRS 1510 Health Counseling**4 QH**

Identifies physical, mental, emotional, and social health problems, remedial procedures, and counseling techniques to aid health educators in dealing more effectively with various health issues.

Prereq. Junior standing or above.

CRS 1800 Directed Study**4 QH**

This experience is provided for the student whose unique academic needs or interests cannot be adequately satisfied in any of the scheduled courses of the department. Directed study requires approval of the supervising faculty member and of the dean's office of the college. Approval forms must be submitted to the dean's office during the quarter prior to registration for the directed study. *Prereq. Permission of instructor.*

Dental Hygiene

DHY courses are open only to Forsyth Dental Hygiene students unless otherwise indicated.

DHY 1100 Oral Anatomy and Histology**3 QH**

Introduces the student to the structures of the oral cavity. Includes the embryology and histology of the head and neck structures with primary emphasis on the oral cavity. Studies the formation, eruption patterns, and morphology of the primary and permanent dentitions. *This course is open to non-dental hygiene majors.*

DHY 1104 Dental Procedures 1**3 QH**

Introduces the student to the discipline of dentistry. Reviews dental specialties with attention given to the roles and responsibilities of the dental assistant. Places emphasis on exposure control, four-handed dentistry, and use and manipulation of some dental materials. A laboratory component is included. *This course is open to non-dental hygiene majors.*

DHY 1105 Dental Procedures 2**4 QH**

Continues DHY 1104. Includes a clinical internship in the Harvard School for Dental Medicine postdoctoral training clinics. Students will have an opportunity to apply skills learned in DHY 1104. *Prereq. DHY 1104. This course is open to non-dental hygiene majors.*

DHY 1204 Head and Neck Anatomy**2 QH**

Provides a clinical study of anatomy of the head and neck. Emphasizes deviations from normal anatomy and the diagnosis and management of these deviations as they relate to the patient.

DHY 1206 Pathology 1**2 QH**

Covers the basics of general pathology with emphasis on oral pathology. Topics include normal structures and those mistaken for disease, principles of general pathology, inflammation, immune process, development disturbances of head, neck, teeth; dental caries, other dental defects, pulpitis and sequelae of pulpitis; and cysts of jaws.

DHY 1208 Periodontology**2 QH**

Discusses the anatomy and physiology of the periodontium as well as the histopathology, etiology, and clinical features of periodontal infections. Emphasizes recognition of and treatment planning for the periodontal patient.

DHY 1211 Dental Hygiene Theory 1**2 QH**

Encompasses the fundamentals of the science of dental hygiene. Introduces the basic principles and skills utilized to provide oral health care for the patient.

DHY 1212 Dental Hygiene Theory 2**2 QH**

Provides the student with information necessary for the dental management and treatment of the medically compromised patient. Discusses the etiology, clinical and oral manifestations, treatment planning, and management considerations for the major medical conditions of concern in dentistry. In addition to assigned readings and lecture information, students will participate in case method projects to facilitate the clinical application of the course material.

DHY 1213 Dental Hygiene Theory 3**2 QH**

Focuses on two aspects of dental hygiene care: 1) understanding the disease process with emphasis on caries, remineralization, and the effects of fluorides; 2) preventing and treating disease with emphasis on dental hygiene treatment planning of dietary counseling, root planing, and curettage procedures. Examines newly developed theories for implementation of ultrasonics and air polishers relative to their appropriate place in comprehensive dental hygiene treatment planning.

DHY 1220 Radiology 1**2 QH**

Uses lectures, slides, and laboratory experiences to provide the student with a basic knowledge and understanding of radiation biology and hygiene; radiographic image receptors and the developing process; and the fundamentals of dental radiography including the production and projection of X-rays. Emphasizes radiographic surveys by means of the paralleling, bisecting angle, and extra-oral techniques.

DHY 1221 Radiology 2**1 QH**

Continues DHY 1220. Students refine their skills in producing diagnostically acceptable radiographs. Emphasizes interpreting films for projection, exposure, processing errors, normal radiographic anatomy, and common diseases/anomalies of the teeth and bone.

DHY 1228 Dental Materials**3 QH**

Studies the basic composition and properties of dental materials utilized in dental hygiene practice. Emphasizes the selection, manipulation, and clinical management of dental materials. Examines the relationship between the oral environment and dental materials. Laboratory sessions are integrated with lectures to provide the student with the opportunity to practice various techniques such as mixing cements, pit and fissure sealants, polishing of amalgam and composite restorations, impression taking, and study models.

DHY 1240 Nutrition**2 QH**

Introduces the science of human nutrition based upon the principles of biochemistry. Reviews the nature and function of the micro- and macronutrients essential for health with specific emphasis on the role diet and nutrition play in the prevention of diseases and the promotion of optimum health and oral wellness.

DHY 1301 Introduction to Oral Health Research**3 QH**

Introduces the currently accepted theories and methods of oral health research. Studies research methods, experimental design, and statistical methods with emphasis on dental epidemiology and clinical research. Reviews current dental research from dental journals to evaluate the methods, design, validity, and relevancy of the research on the professions of dentistry and dental hygiene. Discusses future research and advances in technology to help the student gain a perspective on needed research. Funding sources will also be reviewed.

DHY 1307 Pathology 2**2 QH**

Continues DHY 1206 with emphasis on oral pathology. Covers mucous membrane pathology, clinical and histologic lesions, viral diseases of oral mucosa, ulcerative diseases, traumatic diseases, bacterial diseases including tuberculosis and syphilis, fungal diseases, white lesions, neoplasia, oral cancer, pigmented lesions, and oral manifestations of systemic diseases.

DHY 1314 Dental Hygiene Theory 4**2 QH**

Discusses the dental hygiene management of patients with special developmental/acquired, medical/physical, sensory and/or psychological needs. Topics include gerodontology, disabling/handicapping conditions, major psychiatric disease, dependency disorders, and the cancer patient. Emphasizes barriers and access to care, patient management via normalization of care, the use of adaptive aids, preventive techniques, and individualized treatment planning.

DHY 1315 Dental Hygiene Theory 5**2 QH**

Introduces dental specialties through lectures, slides, and case presentations of dental procedures related to individual specialties. Topics presented by guest lecturers include orthodontics, endodontics, oral and maxillofacial surgery, periodontal surgery, prosthodontics, temporomandibular disorders (TMD), dental implants, maxillofacial prosthetics, pediatric dentistry, and radiovisiography.

DHY 1316 Dental Hygiene Theory 6**2 QH**

Presents material to assist the dental hygiene student to develop the management skills needed to become an effective and productive member of the dental team. Emphasizes identifying professional goals, developing communication skills, writing resumes, perfecting interviewing techniques, and recognizing employer/employee responsibilities and expectations.

DHY 1330 Pharmacology**3 QH**

Places initial emphasis on nomenclature to familiarize the student with the terminology used in pharmacology. Undertakes the study of drugs to acquaint the student with their origin, physical and chemical properties, preparation, modes of administration, and effects upon the body systems. Gives special consideration to those drugs which are of dental value, including antiseptics, antibiotics, pain relieving drugs, and the anesthetics.

DHY 1331 Pain Control**2 QH**

Introduces the dental hygiene student to the recognition and management of pain, fear, and anxiety associated with dental treatment. Lectures will cover basic and current concepts in pain and anxiety control in dental treatment. *Prereq.* Current certification in cardiopulmonary resuscitation and DHY 1330.

DHY 1361 Public Health**2 QH**

Introduces current principles and issues in public health and their relationship to the delivery of oral health care to the public. Investigates and discusses the principles of epidemiology, health care delivery, biostatistics, allied health utilization, and fluoridation. Provides each student with the opportunity to select one issue in public health and explore it by writing a short position paper.

DHY 1362 Community Health**2 QH**

Examines the topics related to community oral health. Explores the principles of program planning and basic health education methods and materials. Provides each student with the opportunity to select a population of interest in the community and plan, implement, and evaluate a preventive oral health program according to

the needs of that population. This experience may help students to recognize a commitment to the community and to accept the responsibilities of a health care professional.

DHY 1364 Seminar in Legal Issues and Ethics**2 QH**

Provides a profile of the dental hygienist within a legal and ethical framework. Examines state practice acts. Students will explore the responsibilities involved in hygienist/patient and employee/employer relationships. Investigates the legal ramifications of a variety of practice settings. Uses case studies and values clarification models to encourage ethical and professional development.

DHY 1401 Oral Health Gerontology**4 QH**

Introduces the dental hygiene student to oral health gerontology. Reviews the biological, psychological, and social aspects of aging. Places an emphasis on oral tissues. Discusses in detail dental hygiene treatment planning and evaluation for both institutionalized and community based elderly patients. Examines public policy and financing of oral health care for the aged. *Prereq.* Extra mural experience required.

DHY 1402 Advanced Public Health**4 QH**

Studies the current issues surrounding today's public health care delivery system in depth. Places emphasis on health legislation both at the state and federal levels. Issues include access to health care, quality assurance/control, and health care costs and financing. Includes evaluation of possible solutions in terms of appropriateness, effectiveness, and economy and a review of health care delivery systems. Students will utilize the principles of oral epidemiology through surveys of specified area populations to develop a health promotion plan.

DHY 1403 Dental Seminars**4 QH**

Reviews the current concepts in dentistry and dental hygiene theory and practice. Discusses the impact of new knowledge on the art and science of dentistry, dental hygiene, and prevention of dental disease. Topics will be determined by current literature and the political and socio-economic climate of the times. Uses integration and sharing of personal experiences and practices relating to dental hygiene to assess and improve student's communication, leadership, decision making, and organizational skills.

DHY 1410 Independent Study**4 QH**

Gives students an opportunity to explore in depth a subject relevant to their interests. Provides the opportunity to study a problem, present a proposal, carry out a study or a course of action, and prepare both written and oral presentations of their activities.

DHY 1500 Directed Study in Special Patient Care**4 QH**

Students will explore an area of interest in special patient care under the direction of an advisor. Includes a supervised field experience at a cooperating local facility. As an integral part of the health care team, students will develop and provide dental hygiene services. Documentation of the experience and a written paper will be required. (Elective-Limited enrollment)

DHY 1510 Student Teaching**4 QH**

Applies the techniques of clinical instruction. Utilizes a background in teaching methods to practice teaching clinical skills in the dental hygiene curriculum. Emphasizes both didactic instruction and teaching of psychomotor skills. Students will work under the direction of a course instructor/coordinator and will have a designated supervisor. Students' clinical skills will be evaluated prior to assignment. (Elective-Limited enrollment)

DHY 1520 Directed Study in Public Health**4 QH**

Provides opportunities to apply knowledge and skills gained in the Public Health courses through field experiences. Students conduct their practicum within local, state, or community agencies as approved by the practicum advisor. (Elective-Limited enrollment)

DHY 1550 Internship**6 QH**

Provides professional field assignment in a setting designed to enhance students in their professional career development. Includes supervision by faculty, conferences with professional staff, projects, and seminars. The usual length of an internship is ten weeks. Students are committed to their assignment for 2.5 days per week for a minimum of 200 hours over the assignment. Internships may be spread over two academic quarters.

DHY 1611, DHY 1612 Clinical Dental Hygiene 1 and 2**3 QH each**

Provides pre-clinical and laboratory instruction in the techniques utilized for the complete evaluation and prophylaxis of patients including instrumentation, polishing, patient evaluation procedures, oral physiotherapy, prevention of disease transmission, medical emergencies, and treatment planning. Pre-clinical activities are coordinated with DHY 1211 and DHY 1212. Actual delivery of patient care begins in DHY 1612. Students will be responsible for patient recruitment. A weekly seminar in DHY 1612 will be conducted stressing human behavior, oral communication, and patient management strategies.

DHY 1613 Clinical Dental Hygiene 3**3 QH**

Provides dental hygiene and other procedures for both adult and child patients in the Forsyth Clinic. Students will be responsible for patient recruitment. A weekly seminar is included for the discussion of patient cases.

DHY 1614, DHY 1615, DHY 1616**6 QH each****Clinical Dental Hygiene 4, 5, and 6**

Provides clinical experience to the dental hygiene student. Students provide preventive, educational, and therapeutic oral health services as delegated by the Commonwealth of Massachusetts at our dental hygiene clinic to children and adults on an appointment basis. Students will be responsible for patient recruitment. In addition to the clinical training at the Forsyth Dental Center dental hygiene clinic, students supplement this training via extramural rotations at area hospitals, community health care centers, and public health care programs. A weekly one-hour seminar relates dental hygiene theory to clinical practice.

DHY 1617 Advanced Perio Clinic**3 QH**

Enables students to extend their skills directed to the treatment of periodontally involved patients. Requires clinical experiences emphasizing evaluation, diagnosis, treatment, and management of patient cases. Treatment therapies could include new and/or experimental modalities of therapy. Includes clinical conferences on treatment procedures and case study presentations. *Prereq.* *Self-assessment of clinical dental hygiene skills prior to the beginning of this course and instructor permission.* (Elective-Limited Enrollment)

HSL 1101 Intermediate Swimming**1 QH**

Focuses on basic and advanced swimming skills, with emphasis on form and efficiency. *Prereq.* *HSL 1100 or equiv.*

HSL 1106 Beginning Scuba**2 QH**

Focuses on basic skin-diving and scuba-diving skills, with emphasis on safety. *Prereq.* *HSL 1101 or equiv.*

HSL 1107 Sailing**1 QH**

Focuses on basic skills in sailing.

HSL 1109 Beginning Gymnastics 1**1 QH**

Introduces, in a coeducational approach, basic skills in floor exercise, vaulting, balance beam, parallel bars, uneven bars, high bar, and rings.

HSL 1110 Women's Gymnastics 2**1 QH**

Focuses on knowledge and skills necessary to perform the beginning compulsory routines on the balance beam, floor exercise, uneven bars, and vaulting. *Prereq.* *HSL 1109.*

HSL 1112 Men's Gymnastics 2**1 QH**

Focuses on skills and knowledge necessary to perform beginning compulsory routines on the high bar, side horse, rings, floor exercise, parallel bars, and vaulting horse. *Prereq.* *HSL 1109.*

HSL 1114 Badminton**1 QH**

Focuses on basic badminton strokes, concepts, rules, strategies, and game play.

HSL 1116 Tennis**1 QH**

Focuses on basic tennis strokes, concepts, rules, strategies, and game play.

HSL 1121 Beginning Self-Defense**1 QH**

Surveys the principles and fundamental skills at the beginning and intermediate levels.

HSL 1126 Karate 1**1 QH**

Focuses on fundamental techniques of unarmed combat for self-defense using the punches, kicks, and blocks of Tae Kwan Do/Karate.

HSL 1127 Karate 2**1 QH**

Continues HSL 1126, with progression to more complex techniques and combinations of punches, kicks, and blocks related to Tae Kwan Do/Karate. *Prereq.* *HSL 1126.*

HSL 1129 Beginning Ice Skating**1 QH**

Focuses on recreational ice-skating skills for beginners.

HSL 1130 Figure Skating**1 QH**

Focuses on beginning and intermediate figure-skating skills. *Prereq.* *HSL 1129 or permission of instructor.*

HSL 1131 Yoga**1 QH**

Introduces yoga skills and techniques for men and women at the beginning level.

HSL 1132 Weight Training**1 QH**

Introduces the principles and use of resistive exercises: isotonic exercise (weights), isometric exercise, and the appropriateness of each.

Health, Sport, and Leisure Studies

HSL 1100 Beginning Swimming**1 QH**

Focuses on basic swimming skills for non-swimmers, with emphasis on personal water safety.

HSL 1133 Physical Conditioning	1 QH	HSL 1160 Jazz Dance 2	1 QH
Focuses on assessing one's personal physical fitness level, with emphasis on establishing a personal exercise regimen based on scientific principles of training. Utilizes special sections for different mediums of exercise, such as aerobic dance techniques, running, and circuit training.		Continues techniques introduced in HSL 1159, with emphasis on developing jazz dance style. <i>Prereq.</i> HSL 1159 or equiv.	
HSL 1134 Aerobic Exercise and Dance	1 QH	HSL 1163 Ballroom Dance	1 QH
Focuses on aerobic fitness, with strong emphasis on concepts of exercise safety and conditioning.		Introduces traditional and contemporary partner dancing.	
HSL 1138 Beginning Skiing	1 QH	HSL 1164 Ballroom Dance 2	1 QH
Focuses on fundamental techniques of downhill skiing. Lab fee.		Continues HSL 1163 with progression into more complex dance steps, partnering techniques, and amalgamations. Expands upon dances taught in HSL 1163 and introduces additional ballroom dances. <i>Prereq.</i> HSL 1163.	
HSL 1139 Intermediate Skiing	1 QH	HSL 1167 Beginning Racquetball	1 QH
Focuses on downhill skiing, including intermediate and advanced techniques. Emphasizes skill development. Lab fee. <i>Prereq.</i> HSL 1138.		Focuses on knowledge and skills appropriate to play racquetball at the beginning level.	
HSL 1140 Basketball	1 QH	HSL 1173 Beginning Track and Field	1 QH
Focuses on knowledge and skills appropriate for playing basketball at the beginning level.		Focuses on the fundamental skills in the various track and field events.	
HSL 1142 Volleyball	1 QH	HSL 1254 First Aid	2 QH
Focuses on knowledge and skills appropriate for playing volleyball at the beginning level.		Focuses on emergency care procedures recommended for home, school, and community, including cardiopulmonary resuscitation (CPR). Emphasizes practices endorsed by the American Red Cross.	
HSL 1146 Softball	1 QH	HSL 1258 Elementary School Activities	3 QH
Focuses on knowledge and skills appropriate for playing softball at the beginning level.		Focuses on introductory knowledge and skills necessary for teaching physical education to children of elementary school age. Gives students the opportunity to learn about children's performance and appropriate teaching techniques through observation and actual experience in off-campus schools and learning centers. Partially satisfies the prepracticum requirements for teacher certification at the K-9 level.	
HSL 1150 Soccer	1 QH	HSL 1259 Secondary School Activities	3 QH
Focuses on knowledge and skill appropriate to play soccer at the beginning level.		Studies physical activity appropriate for secondary school students' level of development and interest. Gives students the opportunity to learn about pupils' performance and appropriate teaching techniques through observation and actual experience in off-campus schools and learning centers. Partially satisfies the prepracticum requirements for teacher certification at the grades 5-12 level.	
HSL 1151 Movement Education	1 QH	HSL 1261 Anatomy and Physiology 1	4 QH
Focuses on concepts and techniques in movement education and exploration for elementary school educators.		Focuses on gross anatomy and physiology of the human skeletal, joint, nervous, and muscular systems.	
HSL 1153 Modern Dance 1	1 QH	HSL 1263 Motor Development and Learning	4 QH
Introduces modern dance technique and style.		Studies the development of motor skills from early childhood through adolescence. Considers age expectations for perceptual motor behavior. Focuses on how information processing is involved in motor learning and performance. Applies basic research data to learning and executing skill in a variety of sport settings.	
HSL 1154 Modern Dance 2	1 QH	HSL 1265 Early Childhood Development	4 QH
Continues HSL 1153, with progression to more complex modern dance techniques and combinations. <i>Prereq.</i> HSL 1153 or equiv.		Studies the development of fundamental motor patterns (run, catch, kick, strike, jump, throw) from ages 0 to 5 years, including perceptual-motor relations operating in vision, audition, and proprioception.	
HSL 1155 Modern Dance 3	1 QH		
Continues HSL 1154, with progression into the expressive and choreographic use of modern dance techniques. <i>Prereq.</i> HSL 1154 or equiv.			
HSL 1156 Ballet 1	1 QH		
Introduces ballet fundamentals, with emphasis on alignment.			
HSL 1157 Ballet 2	1 QH		
Continues HSL 1156, with emphasis on developing lyrical style. <i>Prereq.</i> HSL 1156 or equiv.			
HSL 1159 Jazz Dance 1	1 QH		
Introduces the fundamentals of jazz dance, with emphasis on alignment.			

- HSL 1266 Physical Conditioning Programming** 2 QH
Focuses on how to design and deliver instruction related to physical conditioning and exercises. *Prereq.* HSL 1132 and HSL 1133.
- HSL 1281 Current Issues in Health** 4 QH
Explores topics of current interest, which may include emotional health, nutrition, fitness, sexuality, drug use, disease, consumer issues, and environmental issues. Emphasizes the needs of the participants.
- HSL 1285 Health Concerns of Youth** 4 QH
Applies health concepts to assist youth in reaching a higher level of wellness through preventive measures. Identifies and deals with significant health concerns as they relate to health professionals, teachers, and adults. Partially satisfies the prepracticum requirements for teacher certification grade levels 5–12.
- HSL 1286 Nutrition** 4 QH
Offers the student the opportunity to learn and evaluate nutrition information both as a consumer and a future educator. Explains the chemical, biological, and physiological bases of nutrition.
- HSL 1325, HSL 1326, HSL 1327** 1 QH each
Dance Rehearsal and Performance 1, 2, 3
Gives students the opportunity to develop skill in performance. Also allows students to choreograph, stage, and perform an original work or perform in the original work of a guest or faculty choreographer. *Prereq.* Permission of instructor.
- HSL 1400 Organizational Behavior** 3 QH
Studies human behavior in groups through lectures, reading, and projects. Concentrates on management skills and employment legislation.
- HSL 1401 Program Planning in Recreation** 4 QH
Examines in-depth the steps in planning recreation programs in concert with practical experience.
- HSL 1403 Concepts of Leisure: Sociopsychological Perspectives** 4 QH
Explores the various sociopsychological perspectives of leisure and the relations of mores, social structure, roles, values, and personality to leisure expression. Investigates other pertinent social and environmental factors that contribute to the phenomenon of leisure.
- HSL 1406 Internship Seminar** 1 QH
Offers preparation for professional field assignment in a leisure-service setting. Focuses on identification and assessment of student career goals, analysis of previous volunteer and/or employment experience, professional involvement, and facilitation of the internship placement process.
- HSL 1408 Research Methods** 4 QH
Studies basic statistics, the use of experimental and quasi-experimental design, sampling, instrumentation, data collection, and analysis as applied in recreation and leisure studies.
- HSL 1409 Research Applications** 4 QH
Examines the use of research methods in selected professional applications ranging from the ongoing research of faculty to student-originated studies.
- HSL 1410 Senior Seminar in Contemporary Issues and Trends in Recreation and Leisure** 4 QH
Examines and discusses contemporary issues and trends in the field of recreation and leisure. Focuses on critical aspects of leisure services: legislation, consumer advocacy, professional development, research, and innovations for the improvement of service delivery.
- HSL 1421 Management of Recreation and Physical Education Programs** 4 QH
Focuses on management procedures of recreation and physical education facilities operations. Emphasizes area and facility design, personnel policies, and problem solving related to administration and management.
- HSL 1422 Program Evaluation in Recreation** 4 QH
Examines comprehensive systems for evaluating program effectiveness as it relates to the consumer of recreation services. Emphasizes developing an evaluation system for an agency of the student's choice. Draws case studies from the public, non-profit, and commercial sectors.
- HSL 1423 Commercial Recreation Marketing** 4 QH
Examines commercial and private sector recreation services. Relates case studies, workshops, and practical problems to managing leisure opportunities for resorts, country clubs, theme parks, tourism, sports clubs, manufacturing and merchandising, and industrial recreation.
- HSL 1426 Budget Analysis** 4 QH
Focuses on the study and use of analytical techniques that can improve budgeting decisions. Considers cost-effectiveness and benefit-cost analysis, efficiency measures, and pricing for solutions to capital and operating-budget problems in the non-profit and commercial recreation sectors.
- HSL 1427 Survey of Recreation Facilities** 3 QH
Studies fundamental management, administration, and construction concepts for a wide variety of facilities such as parks, centers, arenas, camps, and marinas.
- HSL 1463 Overview of Physical Disabilities** 4 QH
Offers a holistic and humanistic approach to people with physical disabilities, including amputations, traumatic conditions, sensory impairments, and neurological, orthopedic, and cardiovascular disorders. Studies rehabilitation procedures and treatment, adjunctive therapies, prosthetics, orthotics, assistive devices, and personal care techniques.
- HSL 1511 Independent Study 1** 1 QH
- HSL 1512 Independent Study 2** 2 QH
- HSL 1513 Independent Study 3** 3 QH
- HSL 1514 Independent Study 4** 4 QH
Provides the student with an opportunity for concentrated planning and research in a topic area of health, sport, or leisure. Requires student to submit outline of proposed study.
- HSL 1516 Drug Use and Abuse** 4 QH
Explores the use and abuse of drugs in our society, including prescription and OTC drugs, alcohol, and tobacco. Examines physiological, psychological, and sociological effects of drugs on humans.

HSL 1599 Theory of Coaching**4 QH**

Provides students with the opportunity to study and analyze learning principles, leadership skills, sociology, and psychology as applied to coaching teams and individuals. Focuses primarily on athletes of junior and senior high school age.

HSL 1600 Psychology of Sport**2 QH**

Analyzes the psychological behavioral patterns and deviations of sports participants, including spectators and coaches. Emphasizes emotions, motivation, competition, and learning factors. Discusses current sports highlights. *Prereq.* *Physical education major or permission of instructor.*

HSL 1601 Sociology of Sport**2 QH**

Studies sport as a social institution, including theories explaining its role in society. Considers social stratification, politics, economics, violence, women, race, mass media, and competition.

HSL 1610 Anatomy and Physiology 2**4 QH**

Examines gross anatomy and physiology of the human cardiovascular, respiratory, digestive, urinary, and endocrine systems. Also covers metabolism, calorimetry, and other applied topics. *Prereq.* *HSL 1261.*

HSL 1611 Kinesiology**4 QH**

Investigates science of human motion and anatomic and mechanical principles as they relate to an understanding of skillful, efficient, and purposeful human motion. Examines the internal and external forces acting on a human body and their effects. *Prereq.* *HSL 1261.*

HSL 1615 Critical Teaching Skills**4 QH**

Analyzes direct and indirect, verbal and nonverbal teaching methods for classroom and activity teaching, using techniques such as microteaching, peer teaching, and simulation. Examines techniques for measuring teacher behavior, such as interaction analysis. Requires a lab experience in an education setting. Partially satisfies prepracticum requirements for teacher certification. *Prereq.* *HSL 1258 or HSL 1259; prepracticum experience.*

HSL 1616 Curriculum Development**3 QH**

Focuses on basic foundations of curriculum development. Stresses fundamental principles and guides to curriculum organization, format, and evaluation. Includes experience using the taxonomies of education objectives and survey of existing curricula and current curriculum trends.

HSL 1777 Honors Adjunct**1 QH**

To be added to any four-credit course in the department when approved by the Honors Committee of Boston-Bouvé. Once approved, the adjunct information is forwarded to the honors office for dissemination to the honors membership. Allows enrollment an unlimited number of times as an adjunct to any health, sport, and leisure studies course at different times during a given academic year.

HSL 1800 Supervised Field Experience 1**6 QH**

Includes supervision, evaluation conferences, and seminars as an integral part of this experience. When combined with another approved field-based course (HSL 1801 or HSL 1803), offers assignment in a field setting related to the student's area of study within the curriculum, including observing and performing

professional skills under the guidance of a certified cooperating field professional and college supervisor. Taken by HSL majors not in teacher preparation.

HSL 1801 Supervised Field Experience 2**6 QH**

Includes supervision, evaluation conferences, and seminars as an integral part of this experience. When combined with another approved field-based course (HSL 1800 or HSL 1802), offers assignment in a field setting related to the student's area of study within the curriculum, including observing and performing professional skills under the guidance of a certified cooperating field professional and college supervisor.

HSL 1802 Supervised Student Teaching 1**6 QH**

Provides a supervised teaching experience in an approved school in which the student assumes clear instructional responsibilities for at least half of the time and full teaching responsibilities for a substantial period of time under the guidance of a certified cooperating teacher and college supervisor. Must be at the level of the teacher certification sought. Includes supervision, evaluation conferences, and seminars as an integral part of this experience. Taken by students who wish to apply for teacher certification. Allows a minimum of 300 clock hours for teacher certification to be achieved when the student successfully completes this course and HSL 1801 or HSL 1803. These courses should be taken in the same quarter.

HSL 1803 Supervised Student Teaching 2**6 QH**

Provides a supervised teaching experience in an approved school in which the student assumes clear instructional responsibilities for at least half of the time and full teaching responsibilities for a substantial period of time under the guidance of a certified cooperating teacher and college supervisor. Must be at the level of the teacher certification sought. Includes supervision, evaluation conferences, and seminars as an integral part of this experience. Taken by students who wish to apply for teacher certification. Allows a minimum of 300 clock hours for teacher certification to be achieved when the student successfully completes this course and HSL 1801 or HSL 1802. These courses should be taken in the same quarter.

HSL 1805 Supervised Student Teaching 3**6 QH**

Extends HSL 1802 and HSL 1803 to accommodate students pursuing certification at two levels and who require the additional student teaching practicum of an additional 150 hours. May also be used by student teachers needing extra involvement to meet certification standards not met during HSL 1802 and HSL 1803.

HSL 1863 TAC — Special Problems**2 QH**

Presents directed study in analysis and coaching of a sport or activity not offered by the department or in special scheduling situations, for example, field hockey, football, lacrosse, wrestling. *Prereq.* *Permission of instructor.*

Medical Laboratory Science

MLS 1101 Medical Laboratory Science Orientation 1**1 QH**

Focuses on the history and development of the medical lab science profession; includes an introduction to medical terminology.

MLS 1102 Medical Laboratory Science Orientation 2**1 QH**

Continues discussion of topics introduced in MLS 1101, with the addition of a review of mathematics and metric-unit calculations.

MLS 1109 Foundations of Clinical Laboratory Science 4 QH Examines basic lab methods employed in primary care, including urinalysis, gram staining, hematocrit, hemoglobin, sedimentation rate, white cell count, and differential. <i>Prereq. Admission to physician assistant program or permission of instructor.</i>	MLS 1223 Basic Hematology 1 Lab 1 QH Laboratory for MLS 1123.
MLS 1112 Renal Physiology and Urinalysis 2 QH Introduces basic medical laboratory science. Examines principles and theories of renal physiology. Emphasizes techniques for chemical and microscopic detection of normal and abnormal urinary tract constituents. <i>Prereq. BIO 1107 and CHM 1111.</i>	MLS 1224 Basic Hematology 2 Lab 1 QH Laboratory for MLS 1124.
MLS 1123 Basic Hematology 1 2 QH Introduces hematology procedures and principles; hemoglobin, hematocrit, white and red blood cell counts; and white cell differentiation. Replaces lecture portion of MLS 1121. <i>Prereq. BIO 1107 and CHM 1122.</i>	MLS 1232 Basic Immunohematology Lab 1 QH Laboratory for MLS 1132.
MLS 1124 Basic Hematology 2 2 QH Studies the principles and procedures of hematology, emphasizing hematologic cell maturation, morphology, and basic hemostasis. Replaces lecture portion of MLS 1122. <i>Prereq. MLS 1123 or MLS 1321.</i>	MLS 1242 Basic Clinical Microbiology 1 Lab 1 QH Laboratory for MLS 1142.
MLS 1132 Basic Immunohematology 3 QH Teaches the principles of immunohematology with specific application to the ABO and Rh blood group system, antibody detection, and crossmatch design. Studies basic blood bank techniques including blood typing and crossmatching. Replaces immunohematology lecture portion of MLS 1131. <i>Prereq. BIO 1107, MLS 1171, and MLS 1271.</i>	MLS 1244 Basic Clinical Microbiology 2 Lab 1 QH Laboratory for MLS 1143.
MLS 1142 Basic Clinical Microbiology 1 3 QH Introduces the principles and techniques of organism isolation, cultivation, and identification from clinical specimens. Replaces lecture portion of MLS 1141. <i>Prereq. BIO 1107, CHM 1122, MLS 1171, and MLS 1271.</i>	MLS 1252 Basic Clinical Chemistry and Instrumentation Lab 1 QH Laboratory for MLS 1152.
MLS 1144 Basic Microbiology 2 1 QH Discusses identifying bacteria that are pathogenic for humans according to the isolated organism's clinical specimen. Emphasizes how to collect and transport specimens, what laboratory protocols to use in diagnosis, and procedures for identifying organisms. <i>Prereq. MLS 1142.</i>	MLS 1412 MLT Special Topics—Applied Microscopy 2 QH Offers clinical practicum in applied urinalysis, parasitology, and mycology at an affiliated hospital providing MLT(ASCP)- and CLT(NCA)-level instruction. <i>Prereq. Admission to MLT Clinical Program.</i>
MLS 1152 Basic Clinical Chemistry and Instrumentation 4 QH Covers the principles of clinical chemistry with application to procedures and techniques. In laboratory work, emphasizes the clinical significance and common methods of quantitating selected important analyses. Replaces lecture portion of MLS 1151. <i>Prereq. CHM 1122, and MLS 1112 or MLS 1311.</i>	MLS 1423 MLT Applied Study in Hematology 2 QH Offers clinical practicum in hematology and coagulation at an affiliated hospital providing MLT(ASCP)- and CLT(NCA)-level instruction. <i>Prereq. Admission to MLT Clinical Program.</i>
MLS 1172 Basic Immunology 2 QH Covers the basic concepts of medical immunology, including relationships among disease, immune response, and laboratory procedures. Encompasses the concepts of antigen and antibody structure and relationship, and specific and non-specific host response. Covers common laboratory methods for the detection of antigens and antibodies.	MLS 1432 MLT Applied Study in Blood Banking 2 QH Offers clinical practicum in blood banking at an affiliated hospital providing MLT(ASCP)- and CLT(NCA)-level instruction. <i>Prereq. Admission to MLT Clinical Program.</i>
MLS 1212 Urinalysis Lab 1 QH Laboratory for MLS 1112.	MLS 1442 MLT Applied Study in Clinical Microbiology 2 QH Offers clinical practicum in microbiology at an affiliated hospital providing MLT(ASCP)- and CLT(NCA)-level instruction. <i>Prereq. Admission to MLT Clinical Program.</i>
	MLS 1452 MLT Applied Study in Clinical Chemistry 2 QH Offers clinical practicum in clinical chemistry at an affiliated hospital providing MLT(ASCP)- and CLT(NCA)-level instruction. <i>Prereq. Admission to MLT Clinical Program.</i>
	MLS 1480 MLT Seminar 1 2 QH Offers a basic introduction to correlation of laboratory findings in hematology, blood banking, microbiology, and clinical chemistry, with appropriate referrals of lab information in working situation. Examines basic use of quality control. <i>Prereq. Admission to MLT Clinical Program.</i>
	MLS 1523 Hematology MT Applied Study 4 QH Offers clinical practicum in applied hematology at an affiliated hospital providing for MT(ASCP)- and CLS(NCA)-level instruction. <i>Prereq. Admission to MT Clinical Program.</i>
	MLS 1533 Immunohematology MT Applied Study 4 QH Offers clinical practicum in applied immunohematology at an affiliated hospital providing MT(ASCP)- and CLS(NCA)-level instruction. <i>Prereq. Admission to MT Clinical Program.</i>
	MLS 1544 Clinical Microbiology MT Applied Study 7 QH Offers clinical practicum in applied microbiology at an affiliated hospital providing MT(ASCP)- and CLS(NCA)-level instruction. <i>Prereq. Admission to MT Clinical Program.</i>

- MLS 1552 Clinical Chemistry MT Applied Study** 7 QH
Offers clinical practicum in applied clinical chemistry at an affiliated hospital providing MT(ASCP)- and CLS(NCA)-level instruction. *Prereq. Admission to MT Clinical Program.*
- MLS 1573 Clinical Immunology MT Applied Study 1** 1 QH
Offers clinical practicum in applied clinical immunology at an affiliated hospital providing MT (ASCP)- and CLS (NCA)-level instruction. *Prereq. Admission to MT Clinical Program.*
- MLS 1574 Clinical Immunology MT Applied Study 2** 1 QH
Continues MLS 1573.
- MLS 1601 Foundations of Forensic Laboratory Science** 4 QH
Explores the principles, certainties, and uncertainties of DNA typing and blood typing for identification of individuals in paternity and forensic testing. Surveys physiological and behavioral responses of humans to drugs of abuse, and presents an overview of laboratory testing for those drugs or their metabolites. This course is designed for non-science majors, or science majors desiring an introduction to forensic science. *Prereq. High school biology. High school chemistry desirable.*
- MLS 1621 Advanced Hematology 1** 3 QH
Studies physiology of blood cells and bone marrow; reviews physiology of blood hemopoiesis; discusses hematologic results as they relate to normal, anemic, and leukemic conditions. *Prereq. MLS 1124 or permission of instructor.*
- MLS 1623 Special Topics: Hemostasis** 1 QH
Offers advanced studies in hemostasis, emphasizing identifying factors and solving hemostatic problems. *Prereq. MLS 1124 or permission of instructor.*
- MLS 1631 Advanced Immunohematology** 2 QH
Examines blood group systems, antibody identification, and advanced immunohematologic principles and procedures. Presents case studies. *Prereq. MLS 1332 or MLS 1132.*
- MLS 1648 Advanced Clinical Microbiology** 4 QH
Examines host and microbial interactions in disease produced by viruses, rickettsia, chlamydia, mycoplasma, mycobacteria, anaerobic bacteria, and actinomycetes. Also covers host and microbial interactions in gastrointestinal, genitourinary, and respiratory tract infections. Discusses disease states, diagnostic procedures, and antimicrobial testing. Combines MLS 1645 and MLS 1646. *Prereq. MLS 1142 and MLS 1143.*
- MLS 1654 Advanced Clinical Chemistry 1** 4 QH
Includes current methodologies and instrumentation used in clinical chemistry to evaluate hormonal conditions, drug level monitoring, amino acids, proteins, enzymes, and carbohydrates. Combines content included in MLS 1651 and MLS 1652. *Prereq. MLS 1152, MLS 1351, or permission of instructor.*
- MLS 1655 Advanced Clinical Chemistry 2** 4 QH
Studies metabolism and procedures for nucleic acids, lipids, acid-base balance, hepatic, renal and gastrointestinal systems, as well as vitamin and trace metal blood levels. Combines content included in MLS 1652 and MLS 1653. *Prereq. MLS 1654 or permission of instructor.*
- MLS 1661 Medical Laboratory Science Education** 2 QH
Surveys current topics in medical lab science education: developing objectives, methods of evaluation and certification, clinical instruction and evaluation, medical lab science curricula, and use of media and other methods of instruction. *Prereq. Completion of clinical program.*
- MLS 1662 Clinimetrics** 2 QH
Covers measuring and improving the quality of all steps in the total testing process. Combines Deming's principles of industrial quality management with traditional practices in clinical laboratory quality assurance programs. Discusses design strategies including ordering tests, selecting methods, monitoring analytic quality, and interpreting and reporting tests. Examines each strategy's effectiveness. *Prereq. Completion of MLS clinical applied study.*
- MLS 1665 Medical Laboratory Management** 2 QH
Surveys factors that relate to effective lab administration: hospital organizational structure, principles of management and supervision, cost accounting, purchasing, inspection guidelines, legal responsibilities, and personnel relations. *Prereq. Completion of clinical program.*
- MLS 1672 Immunopathology** 3 QH
Covers the situations in which the host defense response produces the symptoms of disease. Discusses conditions that result from immunodeficiency. Explains the role of the immune system in transplant rejection. Describes neoplasms of the immune system and discusses laboratory procedures used in the diagnosis and management of these conditions. *Prereq. MLS 1171.*
- MLS 1680 MLS Special Topics** 2 QH
Discusses current topics in the clinical lab. *Prereq. MLS 1111, MLS 1121, MLS 1122, MLS 1131, MLS 1141, and MLS 1151.*
- MLS 1681 MLS Senior Seminar** 2 QH
Reviews current undergraduate medical lab science topics.
- MLS 1890 Undergraduate Research** 2 QH
Examines special problems in lab medicine involving individual research under the direction of a faculty member. *Prereq. Permission of instructor.*
- MLS 1891 MLS Current Concepts** 1 QH
Discusses topics determined by recent advances in medical lab science.

Pharmacy

- PAH 1101 Health Career Seminar** 1 QH
Provides students with the opportunity to determine their career goals in the health professions through activity-oriented classes and discipline-specific career information. Addresses self-assessment, career exploration, decision making, and goal implementation. Allows students to gather information about the five majors within the Bouvé College of Pharmacy and Health Sciences.
- PAH 1135 Professional Dynamics in the Health Care Delivery System** 4 QH
Examines the evolution of the American health care delivery system, with emphasis on current aspects of how health care is delivered, how it is financed, where it is delivered, and who delivers it. Discusses present and future influences in health, including

health promotion, disease prevention, and environmental issues. Considers unique and collective health professional roles and responsibilities, humanistic/behavioral dimensions of health care, professional organizations, and professionalism.

PAH 1202 Anatomy-Physiology 1 **5 QH**

Covers structure and function of cells, tissues, and organs, including the muscular, immune, and nervous systems. Includes human skeletal anatomy and cat dissection. Oriented to students in the health professions. Lab fee. *Prereq.* CHM 1122 or CHM 1102, and BIO 1107.

PAH 1204 Anatomy-Physiology 2 **5 QH**

Covers structure and function of the various life-supportive systems not covered in the first quarter: cardiovascular, endocrine, gastro-intestinal, and pulmonary systems. Emphasizes in the lab the basic principles involved in understanding the functioning life systems and cell function. Lab fee. *Prereq.* PAH 1202 or permission of instructor.

PAH 1210 Anatomy-Physiology 1 **4 QH**

Offers students the opportunity to take the lecture portion only of PAH 1202. *Prereq.* Permission of instructor.

PAH 1211 Anatomy-Physiology Laboratory 1 **1 QH**

Offers students the opportunity to take the lab portion only of PAH 1202. *Prereq.* Permission of instructor.

PAH 1212 Anatomy-Physiology 2 **4 QH**

Offers students the opportunity to take the lecture portion only of PAH 1204. *Prereq.* Permission of instructor.

PAH 1213 Anatomy-Physiology Laboratory 2 **1 QH**

Offers students the opportunity to take the lab portion only of PAH 1204. *Prereq.* Permission of instructor.

PAH 1280 Biochemistry **5 QH**

Introduces the structures, functions, and metabolism of amino acids, proteins, carbohydrates, lipids, and nucleic acids. Discusses the mechanisms of enzyme reactions, enzyme kinetics, vitamins, biological oxidation reduction reactions, and bioenergetics, as well as various inborn errors of metabolism. *Prereq.* CHM 1268 and CHM 1269.

PAH 1776 Junior/Senior Honors Thesis **4 QH**

Provides students with the opportunity to become involved with faculty on either ongoing research projects or student-initiated scholarly activities. Encourages and assists students in writing, presenting, and publishing their research. Allows students to gain an awareness and some understanding of a discipline or area of study in the allied health professions while developing an appreciation for research methods and the process of scientific inquiry. Requires a junior/senior thesis. *Prereq.* Honors participation.

PAH 1777 Honors Adjunct **1 QH**

Designed to be attached to a predesignated professional course in the student's major and offered at the discretion of the faculty member(s) teaching the course. For further details, contact the honors office (1 NI) or PAH honors advisor. *Prereq.* Honors participation and permission of instructor.

PCL 1305 Pharmacodynamics **3 QH**

Introduces pharmacologic principles, with the pharmacotherapeutics of drug groups and individual drug substances of particu-

lar importance in treatment and diagnosis of disease. *Prereq.* BIO 1120, BIO 1255, CHM 1111, and CHM 1112.

PCL 1409 Pharmacology for the Respiratory-Care Practitioner **4 QH**

Provides an orientation to pharmacology, including the scope of pharmacology; definitions; drug standards; drug legislation; names, sources, and active constituents; and pharmaceutical preparations of drugs relating to the respiratory-care practitioner.

PCL 1420 Pharmacology/Medicinal Chemistry 2 **6 QH**

Continues discussion of topics introduced in PMC 1419. Presents an interdisciplinary chemical and pharmacological approach to understanding drug action. Deals principally with drugs affecting the peripheral nervous, cardiovascular, and renal systems. *Prereq.* PMC 1419 and middler standing.

PCL 1422 Pharmacology/Medicinal Chemistry 3 **6 QH**

Continues discussion of topics in PCL 1420. Covers the medicinal chemistry and pharmacology of drugs acting on the gastrointestinal, endocrine, reproductive, and hematopoietic systems, along with autocoid and antineoplastics. *Prereq.* PCL 1420 and junior standing.

PCL 1451 Pharmacology Laboratory **1 QH**

Provides experience in systematically monitoring the qualitative effects of selected drugs from major classes of drugs by a modified "Hippocratic Screen" technique. Studies basic quantitative characteristics of drug dose-response relationships, factors influencing such relationships, and general methods of calculating and reporting such data. Lab fee. *Prereq.* PMC 1418 and middler standing.

PCL 1801, PCL 1802, PCL 1803 **4 QH each**
Special Research Project (Pharmacology)

Provides opportunity for directed study or research in pharmacology/toxicology wherein the student may undertake in-depth investigation of an area of specialized interest. Lab fee. *Prereq.* Permission of instructor and program director.

PCT 1240 Pharmaceutical Calculations **4 QH**

Introduces the application of mathematical concepts in pharmacy. Emphasizes systems of measurement and basic arithmetic calculations as they relate to the practice of pharmacy. Also introduces statistical analysis methods required for subsequent courses in pharmaceuticals and for improving problem-solving skills using computers. *Prereq.* CHM 1122.

PCT 1310 Pharmaceutics Laboratory 1 **1 QH**

Focuses on the physicochemical principles of pharmaceutical preparations and their relationship to quality control and biopharmaceutics and pharmacokinetics. *Prereq.* PCT 1340 or concurrent enrollment.

PCT 1320 Pharmaceutics Laboratory 2 **2 QH**

Focuses on the application of the fundamental principles and techniques of pharmaceutics to the lab preparation and use of various pharmaceutical products. *Prereq.* PCT 1350 or concurrent enrollment.

PCT 1350 Pharmaceutics 2 **5 QH**

Focuses on the application of the fundamental principles of physical pharmacy to the formulation of pharmaceutical preparations.

Emphasizes pharmaceutical dosage forms, including both industrial formulation and extemporaneous compounding. *Prereq. PCT 1340 and middler standing.*

PCT 1440 Biopharmaceutics/Pharmacokinetics 4 QH

Acquaints students with biopharmaceutics and basic pharmacokinetics. Discusses dissolution, disintegration, general concept of one- and two-compartment models; linear and nonlinear pharmacokinetics; drug kinetics after intravenous, intramuscular, or oral administration; practical methods of one-compartment model utilizing urinary data; bioavailability; multiple-dosing kinetics; and general approaches to dosage adjustment in disease states. *Prereq. PAH 1204, PCT 1340, and junior standing.*

PCT 1801, PCT 1802, PCT 1803 4 QH each
Pharmaceutics Special Research Project

Provides opportunity for directed study or research in one of the pharmaceutical sciences, wherein the student may undertake in-depth investigation of an area of specialized interest. Lab fee. *Prereq. Permission of instructor(s) and program director.*

PHP 1301 Pharmaceutical Jurisprudence 4 QH

Offers a comprehensive analysis and interpretation of laws relating to the practice of pharmacy. Discusses federal and state food and drug laws, narcotics laws, Medicare and Medicaid regulations, and state pharmacy laws. *Prereq. Junior standing.*

PHP 1302 Pharmacy Administration 1 4 QH

Covers socioeconomic aspects of pharmacy: the government's relation to the pharmaceutical industry, trends in contemporary practice, third-party payment plans, macroeconomic impact on the industry, and the interaction of current concepts in pharmacy. *Prereq. Senior standing or permission of instructor.*

PHP 1303 Interpersonal Skills for Health Professionals 4 QH

Applies the skills of interpersonal communication to situations encountered in various health care settings. Provides students with an opportunity to learn to integrate specific technical competence with serious concern for personal, social, and cultural factors in illness and health care. Through the use of medical sociology literature, audio-visual materials, case analyses, and personal reflection on actual patient encounters, provides the students with an opportunity to improve interpersonal communication skills and to increase their understanding of practitioner patient relationships, patient's needs and responses in illness and treatment, and professional behavior in practice settings.

PHP 1304 Social Pharmacology 4 QH

Studies drug-taking experiences and behaviors. Provides an overview of theories and research findings that describe the relationships between personal, social, and cultural factors and drug taking, while comparing and contrasting the social approach with the pharmacological paradigm of drug effects and the medical model of drug use. Through readings, audiovisual materials, and descriptions of personal experiences, examines the varieties of drug experiences, patterns of and reasons for drug taking of all types, and strategies for preventing drug-use problems.

PHP 1305 Hospital Pharmacy Management 4 QH

Examines the factors involved in the operations and management of a hospital pharmacy within the context of the total hospital structure. *Prereq. Senior standing or permission of instructor.*

PHP 1306 Community Pharmacy Management 4 QH

Focuses on the management requirements for establishing a community pharmacy. Analyzes the prevailing types of organizations, locations, leases, business organization, staffing, plant layout and design, and financial factors. *Prereq. Senior standing or permission of instructor.*

PHP 1308 Financial Management 4 QH

Examines the fundamentals of accounting and finance, with emphasis on their application to retailing and community pharmacy management. Covers accounting systems, analysis of financial statements, budgets, cash flow, taxation, and finance in depth. *Prereq. Permission of instructor.*

PHP 1401 Drug Information and Evaluation 3 QH

Introduces the principles and practice of drug information. Covers the levels of practice, the availability of therapeutic reference sources, the use of abstracting and indexing systems, how to respond to drug information questions, and basic statistical data required to help understand the medical and pharmaceutical literature. *Prereq. Fourth-year standing or permission of instructor.*

PHP 1402 Parapharmaceuticals 2 QH

Focuses on the nature and application of various surgical devices, appliances, bandages, home health care products, and hospital and sickroom supplies in patient care. Also, introduces sterile products. *Prereq. Senior standing.*

PHP 1411 Pathophysiology 4 QH

Focuses on basic concepts of pathophysiology for pharmacy, toxicology, and respiratory therapy majors, emphasizing disease processes and alterations of normal organ functions. *Prereq. PAH 1202, PAH 1204, and middler standing.*

PHP 1441 Therapeutic Drug Monitoring 4 QH

Covers the monitoring, developing, and modifying of drug dosage regimens and the pharmacokinetic factors influencing the regimen selection for various therapeutic drug categories. *Prereq. PCT 1440 and junior standing.*

PHP 1501 Pharmacy Externship 4 QH

Involves a 520-hour (13 weeks x 40 hours/week) structured practicum in community pharmacy. Includes applied aspects of community pharmacy management; medication dispensing; and patient-oriented services such as prescription and nonprescription medication, consultation, and patient-profile monitoring. *Prereq. Fifth-year standing.*

PHP 1503 Professional Practice Laboratory 1 QH

Focuses on compounding and dispensing medications in both institutional and ambulatory pharmacy settings. Emphasizes patient counseling techniques and monitoring appropriateness of therapy. *Prereq. Fifth-year standing.*

PHP 1505 Hospital Pharmacy Externship 4 QH

Provides students with the learning experience needed to develop competency in the delivery of pharmacy services within a hospital setting. The student will receive information and hands-on experience in all phases of inpatient and outpatient dispensing; monitoring drug utilization; hospital committee activities; utilizing hospital reference material; and hospital managerial skills and procedures. *Prereq. PHP 1601 and senior standing.*

- PHP 1506 Clinical Pharmacy Clerkship** 8 QH
Involves assignment to a clinical site for five full days per week to observe patient response to medication and to evaluate and advise on all factors that may modify efficacy, safety, and economy of therapy. Offers campus seminar with student presentations on current therapeutic topics. *Prereq.* PHP 1601 and senior standing.
- PHP 1601 Nonprescription Medication** 4 QH
Provides an overview of the types of over-the-counter medications. Discusses the directions and precautions for proper use of these preparations. *Prereq.* Junior standing.
- PHP 1603 Selected Topics in Clinical Pharmacy 1** 4 QH
Helps students increase their understanding of selected diseases. Examines pathophysiology and diagnosis of the illness as well as drug therapy and its relation to patient compliance and education. Provides greater depth than existing clinical pharmacy courses. *Prereq.* PHP 1602 and permission of instructor.
- PHP 1604 Selected Topics in Clinical Pharmacy 2** 4 QH
Helps increase the student's knowledge of selected disease entities. Examines pathophysiology and diagnosis of the illness as well as drug therapy and its relation to patient compliance and education. Provides greater depth than existing clinical pharmacy courses. *Prereq.* PHP 1602 and permission of instructor.
- PHP 1605 Introduction to Sterile Products** 4 QH
Introduces pharmacists' role in manufacturing and using sterile products. Covers intravenous incompatibilities, aseptic technique, sterile room equipment, quality control, safe handling of cancer chemotherapeutic agents, and sterile product room systems and design. Discusses a variety of sterile products, including parenteral nutrition, small and large volume parenterals, irrigating solutions, cancer chemotherapeutic agents, and ophthalmic preparations. Emphasizes developing an ability to interact with other health professionals. Offers experience using laboratory equipment to prepare sterile products. *Prereq.* Fourth- or fifth-year pharmacy majors only.
- PHP 1607 Cancer Chemotherapeutics** 4 QH
Emphasizes the role of chemotherapy in the management of malignant disease. Discusses clinical applications of specific chemotherapeutic agents, with the remainder of the course concentrating on specific disease states. Covers related topics such as pain control in cancer patients, control of nausea and vomiting, principles of cancer research, cancer quackery, and adverse effects of chemotherapy. *Prereq.* Fourth-year pharmacy major or permission of instructor.
- PHP 1609 Pharmacotherapeutics** 6 QH
Examines the drug treatment of the major pharmacologically managed disease states. Covers selected cardiovascular, respiratory, hepatic, renal, joint, endocrine, psychiatric, and oncologic disorders. *Prereq.* PCL 1420, PCL 1422, PCT 1440, PMC 1419, PMC 1421, and junior standing.
- PHP 1612 Special Topics in Pharmacy Administration** 2 QH
Discusses in-depth a selected topic in the area of pharmacy administration. Topics include business, professional, and environmental management/administrative aspects of pharmacy practice in all settings. *Prereq.* Junior or senior pharmacy majors only.
- PHP 1614 Special Topics in Pharmacy Administration** 4 QH
Discusses in-depth a selected topic in pharmacy administration. Topics include business, professional, and environmental management/administrative aspects of pharmacy practice in all settings. *Prereq.* Junior or senior pharmacy majors only.
- PHP 1801, PHP 1802, PHP 1803, PHP 1804** 4 QH each
Special Research Project
Provides opportunity for directed study or research in clinical pharmacy or pharmacy administration, wherein the student may undertake in-depth investigation of an area of specialized interest. *Prereq.* Permission of instructor.
- PHP 1805 Special Research Project** 3 QH
Offers directed study or research in pharmacy administration, allowing for the in-depth investigation of an area of special interest. *Prereq.* Permission of instructor.
- PHP 1806 Special Research Project** 2 QH
Same as PHP 1805.
- PMC 1322 Pharmaceutical Biotechnology** 3 QH
Introduces the principles of immunology and molecular biology and discusses their applications to the design, development, and use of biopharmaceuticals. Topics include small and large peptides, antibodies, and factors. *Prereq.* PAH 1280.
- PMC 1419 Medicinal Chemistry/Pharmacology 1** 5 QH
Introduces the principles of pharmacology and medicinal chemistry. Discusses the major drug classes affecting the central nervous system, including anxiolytics, sedative-hypnotics, anesthetics, anticonvulsants, neuroleptics, antidepressants, and narcotic analgesics. Considers therapeutic indications, mechanisms of action, structure-activity relations, and undesirable actions including drug abuse. *Prereq.* BIO 1107, CHM 1269, PAH 1202, PAH 1204, and middler standing.
- PMC 1421 Antinfectives** 5 QH
Presents an integrated approach to the study of antiinfective agents. Emphasizes the biochemical basis for the action mechanism of antibacterial, antifungal, and antiviral agents; the chemistry of representative members of the major classes of antiinfective agents; and the pharmacology, pharmacokinetics, and therapeutic applications of drugs used to treat bacterial, fungal, and viral infections. Discusses the AIDS epidemic with a focus on investigating new drugs and treatment modalities that may be valuable in either preventing HIV replication or in the therapy of opportunistic infections. *Prereq.* BIO 1121, PAH 1280, PMC 1419, and junior standing.
- PMC 1801, PMC 1802, PMC 1803** 4 QH each
Special Research Project (Medicinal Chemistry)
Offers directed study or research in one of the medicinal chemistry areas, wherein students may undertake in-depth investigation of an area of specialized interest. Lab fee. *Prereq.* Permission of instructor and program director.

Physical Therapy

PTH 1007 Cooperative Education in Physical Therapy

1 QH

Introduces students to cooperative education and its implications for career planning in physical therapy.

PTH 1114 Introduction to Physical Therapy I

2 QH

Provides orientation to the field of physical therapy and its role in the health professions. Explores theory and practice in applied body mechanics and basic procedures related to patient management.

PTH 1118 Developmental Base of Human Performance

4 QH

Studies the growth and development of perceptual-motor skills from birth to old age. Considers age expectations for perceptual-motor behavior, focusing on the processes underlying developmental changes.

PTH 1202 Therapeutic Modalities in Physical Therapy Practice

3 QH

Provides practice in preparing patients and equipment for various treatment procedures using physical agents. Includes theory, demonstration, and practice in applying heat and cold modalities, hydrotherapy, ultraviolet and laser light therapies, and electrotherapy. *Prereq.* PTH 1114.

PTH 1310 Clinical Gross Anatomy

6 QH

Covers the structure and function of the human body, with particular emphasis on the skeletal, muscular, nervous, and vascular components of each region. Involves lectures, cadaver dissection, osteology labs, and surface anatomy palpation to investigate basic human anatomy and the clinical applications of anatomy lab. *Prereq.* BIO 1152, BIO 1153, and BIO 1154.

PTH 1316 Neuromuscular Physiology

4 QH

An in-depth study of neuromuscular physiology, motor control, and motor learning, with applications to physical therapy practice. *Prereq.* BIO 1152, BIO 1153, BIO 1154, and PTH 1202.

PTH 1320 Soft Tissue Mobilization

2 QH

Offers theory, demonstrations, and practice of manual therapy integrated with other treatment procedures. Also covers anatomical and physiological theory and principles. Uses problem solving and case analyses. *Prereq.* BIO 1254, BIO 1255, and PTH 1202.

PTH 1325 Clinical Medicine I

4 QH

Covers general medicine, lab medicine, and pathology as related to conditions commonly treated by physical therapists. *Prereq.* BIO 1152, BIO 1153, and BIO 1154.

PTH 1330 Clinical Kinesiology

5 QH

Studies normal movement through analysis of muscle and joint function. Also gives clinical applications for pathological movement. Includes lab. *Prereq.* PTH 1310 and PTH 1316.

PTH 1335 Musculoskeletal Evaluation

3 QH

Covers evaluation procedures, including theory, demonstration, practice, and planning. *Prereq.* PTH 1310, PTH 1316, and PTH 1320.

PTH 1341 Musculoskeletal Therapeutic Exercise

5 QH

Explores the theory, planning, and practice of basic therapeutic exercise. Discusses musculoskeletal as well as basic cardiovascular principles. Offers the opportunity to apply principles from other professional courses to design treatment programs using a systematic, problem-solving approach. *Prereq.* Satisfactory attainment in all prior professional courses.

PTH 1345 Orthopedic Clinical Medicine 2

3 QH

Focuses on orthopedic conditions and their medical, surgical, and physical therapy treatment. *Prereq.* PTH 1310, PTH 1316, and PTH 1325.

PTH 1352 Psychosocial Aspects of Illness

3 QH

Examines interpersonal relationships among patients, families, health professionals, and society, with reference to the impact of and reaction to illness. *Prereq.* Satisfactory attainment in all prior professional courses.

PTH 1356 Prosthetics

1 QH

Studies theory, demonstration, and current practice in prosthetics. *Prereq.* PTH 1316, PTH 1330, PTH 1335, PTH 1341, and PTH 1345.

PTH 1360 Neurological Therapeutic Exercise

4 QH

Presents theoretical basis and clinical application of integrated approaches to treatment of neurologically impaired clients. *Prereq.* Satisfactory attainment in all prior professional courses.

PTH 1361 Neurological Assessment and Adult Neurology

3 QH

Focuses on assessing problems of and setting goals for adults with neurological deficits. Covers the etiology, pathology, clinical signs, and medical management of neurological disorders. *Prereq.* Satisfactory attainment in all prior professional courses.

PTH 1366 Neuroanatomy

5 QH

Examines morphology and function of the human nervous system. Covers abnormalities of structure and function of the nervous system. Includes lecture and lab. *Prereq.* Satisfactory attainment in all prior professional courses.

PTH 1370 Clinical Seminar

2 QH

Discusses selected topics related to clinical aspects in physical therapy. Considers interpersonal relationships, ethics, teaching-learning process, communication, group dynamics, medical-legal issues, sociocultural/socioeconomic considerations, and clinical education information. *Prereq.* Satisfactory attainment in all prior professional courses.

PTH 1380 Supervised Clinical Education I

5 QH

Introduces clinical experience that provides the student with opportunities to practice various skills in the evaluation and treatment of patients under supervision. Requires five weeks during Quarter 9 of the junior year in Massachusetts. *Prereq.* Satisfactory attainment in all prior professional courses.

PTH 1386 Pediatric Neurology

2 QH

Focuses on the pediatric and neurologic aspects of physical therapy practice. Reviews symptoms, conditions, and therapeutic/medical intervention. *Prereq.* Satisfactory attainment in all prior professional courses.

PTH 1391 Cardiopulmonary Rehabilitation in Physical Therapy 4 QH
Discusses the role of physical therapy in cardiac and pulmonary rehabilitation. Examines cardio-pulmonary evaluation techniques, etiology, and pathology of common cardiopulmonary disorders and physical therapy management. *Prereq. Physical therapy students who have satisfactorily completed all prior professional courses, or respiratory therapy and cardiovascular specialist majors by permission of academic adviser.*

PTH 1392 Pathophysiology and Clinical Therapeutics 1 QH
Covers selected topics in pathophysiology and clinical therapeutics related to current practice in physical therapy. *Prereq. Satisfactory attainment in all prior professional courses.*

PTH 1396 Pediatric Evaluation/Treatment 2 QH
Explores evaluating and treating the motor aspects of the neuro-muscularly impaired child. Focuses on analyzing normal movement patterns, recognizing movement dysfunction, and treating movement dysfunction. *Prereq. Satisfactory attainment in all prior professional courses.*

PTH 1400 Administration 4 QH
Explores concepts in administration and management applied to physical therapy. Involves seminar and discussion groups. *Prereq. PTH 1380.*

PTH 1405 Research for Physical Therapy 4 QH
Covers introduction to research design, basic statistics, analysis of scientific and medical literature, and preparation of an independent research proposal. *Prereq. Satisfactory attainment in all prior professional courses.*

PTH 1411 Clinical Integration 4 QH
Incorporates analysis and comparison of methods of physical therapy evaluation and treatment, with an emphasis on therapeutic exercise. Focuses on treatment planning for various problems, with emphasis on rationale and selection of treatment alternatives. Uses case study format and case simulations. *Prereq. Satisfactory attainment in all prior professional courses.*

PTH 1415 Supervised Clinical Education 2 0 QH
Provides advanced clinical education by giving the student further opportunities to practice various phases of physical therapy under supervision in preparation for assuming the role of a qualified physical therapist. Involves assignments in Massachusetts and other states, and twelve weeks during senior year. Required for graduation from the physical therapy program. *Prereq. Satisfactory attainment in all prior professional courses.*

PTH 1420 Physical Therapy in the Health Care System 3 QH
Examines major issues affecting the delivery of health care. Emphasizes the role of the physical therapist as a member of the health team. Involves class discussion and seminar. *Prereq. PTH 1370 and PTH 1380.*

PTH 1426 Functional Aspects of Aging 3 QH
Discusses the interaction of psychological, social and physiological factors and their effects on the potential for function of the elderly client. Studies and designs assessment instruments. *Prereq. PTH 1370 and PTH 1380.*

PTH 1453 Advanced Musculoskeletal Assessment and Treatment 3 QH
Provides an opportunity to develop knowledge and skills in evaluating and treating joint dysfunction. Uses a problem-solving approach. *Prereq. Satisfactory attainment in all prior professional courses.*

PTH 1602 Special Topics in Physical Therapy 2 QH
Offers innovative methods of instruction and deals with areas of special interest.

PTH 1604 Special Topics in Physical Therapy 4 QH
Offers innovative methods of instruction and deals with areas of special interest.

PTH 1777 Honors Adjunct 1 QH
Constitutes an addition to any three-, four-, five-, or six-quarter-hour course in the department when approved by the honors committee of the college. Once approved, the adjunct information is forwarded to the honors membership by the honors office. Allows students to enroll an unlimited number of times as an adjunct to any physical therapy course.

PTH 1800 Directed Study 2 QH
Provides experience for the student whose unique academic needs or interests cannot be adequately satisfied in the basic, entry-level curriculum of the Department of Physical Therapy. *Prereq. Permission of instructor, chair, and dean.*

Speech-Language Pathology and Audiology

SLA 1101 Introduction to Speech and Hearing 4 QH
Offers an overview of disorders of speech and hearing and their treatment, and a review of normal speech and hearing development. Requires clinical observations of persons with speech, language, and hearing disorders.

SLA 1200 Speech and Hearing Science 4 QH
Presents concepts and information related to the physics of sound and principles of psychophysics and audition. Introduces the anatomical and physiological basis of speech sound production and the acoustic analysis of speech. Examines current theories and research in speech reception, perception, and production.

SLA 1201 Anatomy and Physiology of Vocal Mechanisms 4 QH
Offers an in-depth study of the static structure, musculature, and physiology of the speech mechanism. Emphasizes current research in speech physiology. *Prereq. SLA 1101.*

SLA 1300 Language Acquisition 4 QH
Analyzes the emerging semantic and syntactical aspects of language in normal and atypical children. Discusses current theory and research in language acquisition. Requires clinical observations of children with normal and atypical language patterns. *Prereq. SLA 1101.*

SLA 1301 Phonetics and Developmental Phonology**4 QH**

Offers basic training in auditory recognition and symbolization of phonemes and allophones in major American dialects. Stresses static and dynamic articulatory descriptions. Also includes a review of the developmental sequence of phonemic acquisition.

Prereq. SLA 1101 and SLA 1201.

SLA 1303 Introduction to Audiology**4 QH**

Focuses on the basic techniques of audiometric testing and hearing conservation, including a review of basic hearing sciences and a prepracticum and laboratory experience in hearing testing.

SLA 1403 Clinical Procedures in Speech and Language**4 QH**

Reviews principles and procedures of the functional analysis of behavior. Focuses on applying behavioral theory and research to speech, language, and hearing training. Emphasizes clinical investigation in the experimental analysis of behavior, and offers experience applying experimental procedures in assessing and treating people with communication disorders.

SLA 1460 Neurological Bases of Communication**4 QH**

Provides an opportunity to acquire an understanding of neuroanatomy and neurophysiology as they relate to normal aspects of speech, hearing, and language.

SLA 1800 Directed Study**4 QH**

Provides study for the student whose unique academic needs or interests cannot adequately be satisfied in any of the scheduled courses of the department. Requires approval of the supervising faculty member, the chair, and the dean. Also requires that approval forms be submitted to the dean's office during the quarter prior to registration for the directed study. *Prereq.*

Permission of instructor.

TOX 1302 Chemical and Analytical Toxicology**4 QH**

Continues TOX 1301. Places additional emphasis on the interpretation of the toxicological literature to evaluate the risk involved from exposure to prototype chemicals. Uses structure activity and biochemical methods of assessment to evaluate the toxicity of major classes of chemical compounds. *Prereq.* PMC 1418 and TOX 1301.

TOX 1322 Biochemical Toxicology Laboratory**4 QH**

Introduces the student to investigational methods for assessing toxicity; helps develop the student's ability to analyze and interpret data generated in the lab and in the literature; and helps the student develop technical writing skills. Uses rodents as a model for toxic insult. Examines hepatotoxicity, neurotoxicity, teratogenicity, and other toxic manifestations at the whole-animal, whole-tissue, and biochemical levels. *Prereq.* TOX 1300, TOX 1301, or TOX 1302.

TOX 1811, TOX 1812, TOX 1813 Toxicology Research**4 QH each**

Students participate in faculty-directed research projects in the toxicology laboratory.

Toxicology

TOX 1100 Toxicology Orientation**1QH**

Introduces toxicology as it relates to regulatory, environmental, forensic, and clinical issues. Focuses on general principles of toxicology and their application to determining the hazards of toxicants in the workplace, the home, and the environment.

TOX 1101 Current Topics in Toxicology**1 QH**

Discusses topics of interest to toxicology, pharmacy, biology, chemistry, nursing, and related majors. Selects topics from current research that span regulatory, public health, and environmental issues. Explores other toxicology-related topics.

TOX 1300 Clinical Toxicology**4 QH**

Examines the potential toxicity of drugs, commercial products, and environmental agents. Focuses on clinical manifestations, mechanisms of toxicity, principles of treatment, and prevention of acute and chronic poisonings. *Prereq.* PMC 1418.

TOX 1301 Fundamental Principles of Systemic Toxicology**4 QH**

Presents the principles of toxicology from an organ-system perspective. Focuses on the basic concepts used to evaluate toxicity, the mode of injury at the organ and cellular levels, and the basic subcellular mechanisms through which toxic agents produce damaging effects. Uses recent toxicological literature to introduce the concepts needed to evaluate toxicity through the analysis of data. *Prereq.* PMC 1418.

ROTC, Military Officers' Training Program

AIR 1110 Air Force Today 1	1 QH	Discusses organizational and personal values, management of forces in change, organizational power, politics, and managerial strategy and tactics in the context of the military organization. Uses actual Air Force cases to enhance the learning and communication processes.
Examines the role of the United States Air Force in the contemporary world. Surveys background, mission, and organization of the Air Force and functions of United States strategic forces. Also emphasizes development of written communicative skills.		
AIR 1111 Leadership Laboratory 1	1 QH	AIR 1321 Leadership Laboratory 8 1 QH
Introduces the customs, traditions, and courtesies of the Air Force through guest speakers, seminars, and a field trip to an Air Force base.		Continues AIR 1311. Emphasizes supervisory and leadership skills. Discusses advantages of an Air Force career.
AIR 1120 Air Force Today 2	1 QH	AIR 1410 United States National Security Forces 1 4 QH
Continues study of the contemporary Air Force by examining general-purpose forces, aerospace support forces, and the total force structure.		Studies the role of the military in maintaining the security of the United States. Examines the international environment, the background of defense policy, strategy, and forms of conflict. Addresses specific issues, including weapons acquisition, arms control, nuclear deterrence, and the national military decision-making process.
AIR 1121 Leadership Laboratory 2	1 QH	AIR 1411 Leadership Laboratory 5 1 QH
Continues AIR 1111, with emphasis on the role and responsibilities of an Air Force company grade officer.		Focuses on exercise of management functions in planning, supervising, and directing cadet group activities. Provides opportunity to acquire proficiency in military leadership skills.
AIR 1210 Development of Air Power	1 QH	AIR 1420 United States National Security Forces 2 4 QH
Traces the historical development of air power and its uses starting before the Wright Brothers and extending through the Korean War. Concentrates on the advent of the air age, the airplane at war (1914-1918), the interwar years, air power in World War II, the Berlin Airlift, air power in the Korean War, and the evolution of air power concepts and doctrine. Emphasizes student participation and presentations to enhance communicative skills.		Studies the military's role as an institution in a democratic society. Includes such topics as civil-military interaction and the military as a profession. Emphasizes developing communicative skills through student presentation.
AIR 1211 Leadership Laboratory 3	1 QH	AIR 1421 Leadership Laboratory 6 1 QH
Emphasizes development of techniques used to direct and inform. Assigns students to leadership and management positions in the AIR 1111 programs previously described.		Continues AIR 1411. Gives students the opportunity to prepare themselves for professional duties.
AIR 1220 Development of Air Power	1 QH	ARM 1100 Leadership Laboratory 1 0 QH
Traces the historical development of air power and its uses starting after the Korean War and continuing through its present role in international policies. Students also begin five hours of introductory leadership. Continues emphasis upon student participation and presentations to enhance communicative skills.		Introduces first-year ROTC students to the basic tenets of discipline and regimentation of the United States Army. Includes the basics of proper wear of military clothing, proper rendering of military courtesies, military customs and traditions, individual and group drill and ceremonies, manual of arms for the M16A1 rifle, and physical fitness training.
AIR 1221 Leadership Laboratory 4	1 QH	ARM 1101 Introduction to the Army 1.5 QH
Continues AIR 1211. Adds a special program in preparation for field training.		Introduces the student to the U.S. Army. Subjects include customs and courtesies of the Army, Army traditions, rank structure and chain of command, wear and appearance of the uniform, branches of the Army, and the role of military power in the world today. Also introduces the Army writing style and physical fitness training.
AIR 1310 Management and Leadership 1	4 QH	ARM 1102 Leadership vs. Management Styles 1.5 QH
Examines management and leadership from the point of view of the Air Force junior officer. Covers the individual motivational and behavioral processes, leadership, communication, and group dynamics to provide a foundation for the development of the junior officer's professional skills as an Air Force officer.		Teaches leadership and management concepts. Illustrates particular management skills: problem analysis and decision-making, planning and organizing, delegation and control, and interpersonal skills. Uses realistic management simulations and structured exercises to teach essential leadership skills.
AIR 1311 Leadership Laboratory 7	1 QH	ARM 1103 Basic Tactics 1.5 QH
Provides supervisory practice and exercise of leadership functions in controlling and directing activities of the cadet group. Develops leadership potential in a practical, supervised training lab.		Examines the mission, organization, and composition of the basic infantry rifle squad and platoon. Includes basic combat formations, movement techniques, unit capabilities, and planning considerations.
AIR 1320 Management and Leadership 2	4 QH	
Continues AIR 1310 with special emphasis on the basic managerial processes involving decision making, use of analytical aid in planning, organizing, and controlling in a changing environment.		

ARM 1200 Leadership Laboratory 2**0 QH**

Presents introduction and hands-on training for second-year ROTC cadets. Includes required basic military skills, including nuclear, biological, and chemical protective training; selected weapons training; use of United States Army communications equipment; land navigation; orienteering, rappelling; and limited military vehicle maintenance training.

ARM 1201 Basic Rifle Marksmanship**1 QH**

Provides instruction and practical application in basic rifle marksmanship techniques, safety, and range operations.

ARM 1202 Comparative Armies**1.5 QH**

Presents an introduction to the roles and organization of the United States Army's Active, Reserve, and National Guard. Uses these concepts as building blocks to examine and compare armies currently affecting United States doctrine and tactics. Integrates the Soviet, Warsaw Pact, NATO, and other world forces into the course structure through the study and examination of current events inside and outside the military establishment.

ARM 1203 Health and Physical Fitness**1.5 QH**

Presents information for the basic Army ROTC cadet on the components and principles of health, exercise, and physical fitness. Addresses basic health issues, emphasizing proper nutrition, weight control, and stress management. Introduces the student to exercise physiology including flexibility and stretching, cardiorespiratory fitness, and resistance and Nautilus equipment. Reviews methods to improve the cadet's individual score on the Army's physical fitness test.

ARM 1300 Leadership Laboratory**0 QH**

Provides advanced leadership applications for the middler-year Army ROTC cadets. Includes the review and hands-on training of all basic military skills learned in the ROTC basic program of instruction. Gives middler cadets increased leadership responsibility within the cadet battalion for further development and evaluation as well as preparation for their junior year Camp All American platoon training.

ARM 1301 Land Navigation**2 QH**

Presents advanced land navigation techniques to junior-year ROTC cadets. Introduces the topographic map and its commonly used symbols. Identifies common terrain features. Topics include measuring directional azimuths as well as straight line and road distance on a map; and converting azimuths, locating unknown points using the intersection, resection, and modified resection techniques. Requires the student to navigate using a map and compass.

ARM 1302 Advanced Tactics and Training**2 QH**

Introduces the fundamentals of offensive and defensive combat at the squad and platoon levels. Includes unit organizations and capabilities, tactical planning, combat orders. Utilizes practical exercises placing the student in leadership roles in simulated tactical environments. Additionally, examines the proper method to conduct briefings, provide training input, and prepare, conduct, and evaluate training. *Prereq. Basic course completion.*

ARM 1303 Advanced Leadership Clinic**2 QH**

Provides classroom, programmed instruction, and practical exercises (for example, land navigation, physical conditioning, weapons familiarization, and leadership) designed to prepare

cadets for maximum individual performance at the six-week ROTC advanced camp. Required for all cadets attending advanced summer camp at Fort Bragg, North Carolina. *Prereq. Basic course completion.*

ARM 1305 Advanced Leadership Laboratory 5**6 QH**

Provides external leadership lab conducted at Fort Bragg, North Carolina, during the summer quarter. As an intensive six-week course, includes application of leadership principles in positions at varying levels of responsibility. Also includes supplemental instruction such as physical conditioning, counseling, senior-subordinate relations, tactical doctrine, international laws of land warfare, and approaches to problem solving. Course attended by students from 123 colleges and universities from Maine to Florida. All expenses borne by the United States government, including a stipend of approximately five hundred dollars.

ARM 1400 Leadership Laboratory 4**0 QH**

Gives fourth-year ROTC cadets practical application of previously learned skills, techniques, education, and experience by assisting ROTC cadre in the conduct of ARM 1100, ARM 1200, and ARM 1300. Gives cadets an opportunity to prepare and present instruction, manage constrained resources, and supervise subordinates. Evaluates cadets based on active-duty Army criteria. Requires attendance by all fourth-year ROTC cadets enrolled in an ROTC course.

ARM 1401 Organization and Communications Skills**2 QH**

Examines the theory, methods, and principles for understanding and motivating human behavior in organizations. Emphasizes the principles and dynamics of leadership. Directs those principles toward the development of leadership styles. Introduces the officer and noncommissioned officer evaluation system. Makes practical applications through the use of case studies and group processes. *Prereq. Basic course completion.*

ARM 1402 Military Law and Ethics**2 QH**

Examines the issues and responsibilities imposed by law on commanders and staff officers in two broad areas: the military criminal justice system and military administrative law. Presents in-depth analysis of the responsibilities and duties of officers and noncommissioned officers operating in the military justice system. Focuses on the legal basis for command and on administrative due process, judicial review of military activities, and other topical issues. Gives students the opportunity to address and develop an understanding of the need for ethical conduct, and an awareness and sensitivity to ethical issues. *Prereq. Basic course completion.*

ARM 1403 Leadership Seminar and Ethics**2 QH**

Provides senior ROTC cadets with need-to-know information that facilitates their entry into active duty. Also provides a forum for the study of personnel, training, logistical, and installation support systems. Discusses personal finances as well as the officer and noncommissioned officer evaluation systems. Gives students the opportunity to address and develop an understanding of the professional ethics of officership, including the need for ethical conduct, and an awareness of and sensitivity to ethical issues. *Prereq. Basic course completion.*

NAV 1100 Naval Science Laboratory**0 QH**

Focuses on either drill instruction or practical work to complement classroom instruction. Must be taken in each class quarter by all NROTC students.

NAV 1101 Introduction to Naval Science**3 QH**

Presents a general introduction to the naval profession and the concepts of seapower. Emphasizes the mission, organization, and warfare components of the United States Navy and Marine Corps. Includes an overview of officer and enlisted ranks and rates, training and education, and career patterns. Also covers naval courtesy and customs, military justice, leadership, and nomenclature. Exposes the student to the professional competencies required to become a naval officer.

NAV 1102 Naval Ships Systems 1**4 QH**

Studies in detail ship characteristics and types, including ship design, hydrodynamic forces, stability, compartmentation, propulsion, electrical and auxiliary systems, interior communication, ship control, and damage control. Includes basic concepts of the theory and design of steam, gas turbine, and nuclear propulsion. Also discusses shipboard safety and firefighting. *Not required for nursing students.*

NAV 1201 Naval Ships Systems 2**4 QH**

Outlines the theory and employment of weapons systems. Explores the processes of detection, evaluation, threat analysis, weapon selection, delivery, guidance, and explosives. Discusses fire control systems and major weapons types, including capabilities and limitation. Describes the physical aspects of radar and underwater sound in detail. Explores the facets of command, control, and communications as a means of weapons system integration. *Not required for nursing students.*

NAV 1202 Seapower and Maritime Affairs**3 QH**

Surveys United States naval history from the American Revolution to the present with emphasis on major developments. Includes an in-depth discussion of the geopolitical theory of Mahan. Also treats present-day concerns in seapower and maritime affairs, including the economic and political issues of merchant marine commerce, the law of the sea, the Russian navy and merchant marine, and a comparison of United States and Soviet naval strengths.

NAV 1301 Navigation and Naval Operations 1**4 QH**

Studies piloting and celestial navigation, including theory, principles, and procedures. Focuses on piloting navigation, including the use of charts, visual and electronic aids, and the theory and operation of magnetic and gyro compasses. Covers celestial navigation in depth, including the celestial coordinate system, an introduction to spherical trigonometry, the theory and operation of the sextant, and a step-by-step treatment of the sight reduction process. Gives students the opportunity to develop practical skills in both piloting and celestial navigation. Discusses other topics such as tides, currents, effects of wind and weather, plotting, use of navigation instruments, types and characteristics of electronic navigation systems, and the day's work in navigation. *Not required for nursing students.*

NAV 1302 Navigation and Naval Operations 2**4 QH**

Studies the international and island rules of the nautical road, relative-motion-vector analysis theory, relative motion problems, formation tactics, and ship employment. Also includes introduction to naval operations and operations analysis, ship behavior and characteristics in maneuvering, applied aspects of ship handling, and afloat communications. *Not required for nursing students.*

NAV 1310 Evolution of Warfare**4 QH**

Traces the development of warfare from the dawn of recorded history to the present, focusing on the impact of major military theorists, strategists, tacticians, and technological developments. Gives the student the opportunity to acquire a basic sense of strategy, to develop an understanding of military alternatives, and to see the impact of historical precedent on military thought and action. *Not required for nursing students.*

NAV 1401 Leadership and Management 1**3 QH**

Studies at an advanced level organizational behavior and management in the context of the naval organization. Includes such topics as the management functions of planning, organizing, and controlling; individual and group behavior in organization; and motivation and leadership. Explores major behavioral theories in detail. Investigates practical applications by the use of experiential exercises, case studies, and lab discussions. Develops other topics, including decision making, communication, responsibility, authority, and accountability.

NAV 1402 Leadership and Management 2**3 QH**

Studies naval junior officer responsibilities in naval administration. Exposes the student to a study of counseling methods, military justice administration, naval human resources management, directives and correspondence, naval personnel administration, material management and maintenance, and supply systems. As the capstone course in the NROTC curriculum, builds on and integrates the professional competencies developed in prior course work and professional training.

NAV 1410 Amphibious Warfare**4 QH**

Surveys the historical development of amphibious doctrine and the conduct of amphibious operations. Emphasizes the evolution of amphibious warfare in the twentieth century, especially during World War II. Explores present-day potential and limitations on amphibious operation, including the rapid deployment force concept. *Not required for nursing students.*

Alternative Freshman-Year Program

ECN 4601 Economics 1

4 QH

Examines development of macroeconomic analysis, national income concepts, national income determination fluctuation and growth, role of the banking system and the Federal Reserve System, government expenditures and taxation, international trade, and balance of international payments.

ED 4001 Integrated Language Skills Development 1

2 QH

Strives to improve a student's reading comprehension and related study and language skills. Devotes time, discussion, and considerable practice to meaning skills such as basic reading comprehension and interpretation, including work in critical reading and other interpretational acts (inferences, understanding imagery, and symbolic usage). Focuses on study skills, previewing, finding main ideas and details, outlining and summarizing, continuous interaction, and interaction of all the communications skills—reading, writing, listening, and speaking.

ED 4002 Integrated Language Skills Development 2

2 QH

Continues discussion of topics introduced in ED 4001. *Prereq.* ED 4001.

ED 4003 Integrated Language Skills A

4 QH

Strives to improve a student's reading comprehension and related study and language skills. Devotes time, discussion, and considerable practice to meaning skills such as basic reading comprehension and interpretation, including work in critical reading and other interpretational acts (inferences, understanding imagery, and symbolic usage). Focuses on study skills, previewing, finding main ideas and details, outlining and summarizing, continuous interaction, and interaction of all the communications skills—reading, writing, listening, and speaking.

ED 4004 Integrated Language Skills B

4 QH

Extends ED 4003, with continued emphasis on study skills, including researching, organizing, and writing term papers. Explores critical thinking as it relates to the learning process. Also addresses the choices of academic major and career direction, emphasizing self-assessment and personal decision making. *Prereq.* ED 4003.

ENG 4013 Fundamentals of English 1

4 QH

Presents an intensive introduction to the principles of effective expository writing. Emphasizes description, paragraph construction, and organization. Reviews English usage, punctuation, and syntax. Includes essay assignments.

ENG 4014 Fundamentals of English 2

4 QH

Presents intensive instruction in exposition, argument, and academic essay writing and includes instruction in the writing of a research paper. Continues emphasis on English usage, punctuation, and syntax. Includes essay assignments.

HST 4110 History of Civilization A

4 QH

Covers the major ideas and institutions of civilization from ancient times to 1648.

HST 4111 History of Civilization B

4 QH

Continues HST 4110, covering the period since 1648.

MGT 4110 Survey of Business and Management

4 QH

Offers an introduction to the setting and general structure of American business, the characteristics of private enterprise, and the nature and challenge of capitalism and other forms of economic enterprise. Discusses the forms of business, the structure of organization, and the functions of management in the context of their influence on the various forms of business. Through lecture and class discussion, the student gives an overview of the methodologies used in planning, organizing, directing, and controlling the functions of production, marketing, sales, pricing, and finance.

MTH 1000 Mathematical Preliminaries 1

4 QH

Reviews precollege mathematics, primarily arithmetic. Covers operations with numbers, fractions, decimals, percents, and graphs (pictographs, bar graphs, circle graphs, etc.), together with applications of these skills and concepts.

MTH 1010 Mathematical Preliminaries 2

4 QH

Surveys precollege algebra, including signed numbers, exponents, multiplication of polynomials, factoring, linear equations, graphing, and radicals. For students whose background in algebra is weak.

MTH 1101 Basic Algebraic Applications

4 QH

Examines systems of linear equations and their graphs. Focuses on graphic systems of linear inequalities in two variables that apply to linear programming. Introduces matrices, matrix multiplication, and vectors. *Students do not receive credit for MTH 1101 if they have already received credit for MTH 1113.*

MTH 1113 College Mathematics for Business

4 QH

Examines sets, rectangular coordinates and graphs, functions and functional notation, linear and quadratic functions, exponential and logarithmic functions, systems of linear equations, summations, inequalities, permutations and combinations, elementary probability concepts, compound interest, and annuities.

POL 4106 Introduction to Politics

4 QH

Studies the basic political concepts and forces of organization from the classical Greeks to the modern nation-state. Contrasts the Soviet Union and the United Kingdom as contemporary illustrations of the institutional distinction between a totalitarian and a constitutional system.

SOC 4010 Principles of Sociology 1

4 QH

Introduces basic concepts and theories relating to the study of humans as participants in group life. Emphasizes socialization, culture, social structure, primary groups, family, social stratification, and population.

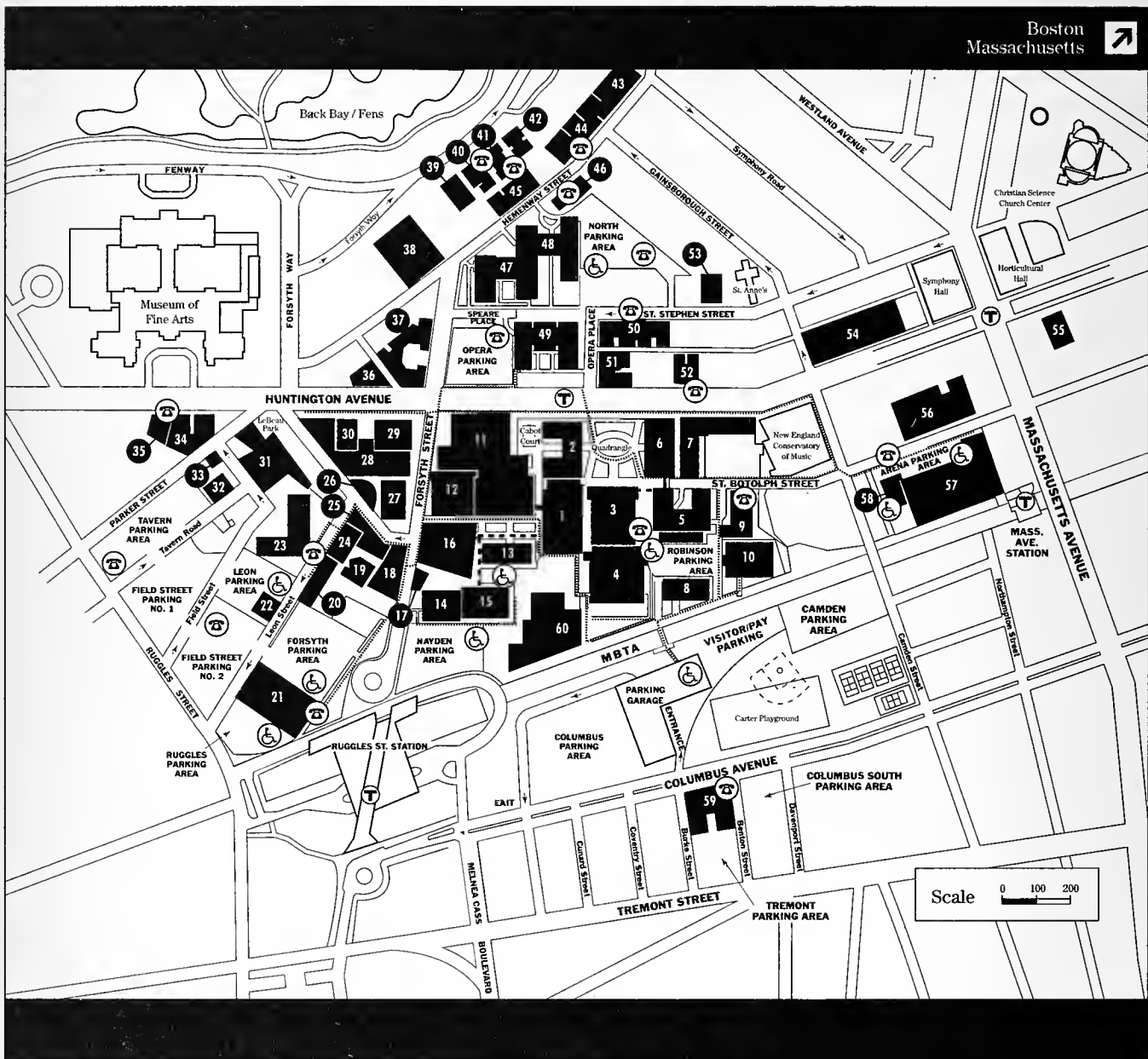
SOC 4011 Principles of Sociology 2

4 QH

Continues SOC 4010. Emphasizes critical analysis of American society, with attention to problems of social, political, urban, and industrial change.

Appendix

Campus Map



Key

Academic, residential,
and service buildings

Handicap parking

Accessible routes

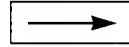
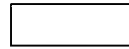
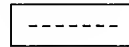
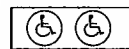
Parking areas

Street direction

Underground tunnel

Emergency telephone

TTY locations

See alphabetic list of buildings
for TTY locations.

Maps are provided by the Information Center, 115 Richards Hall, extension 2736 (TTY extension 3768). Some buildings on this map are used but not owned by Northeastern University. 8/93

Academic and Service Buildings

22	John D. O'Bryant African-American Institute (AF)	7	316 Huntington Avenue
12	Barletta Natatorium (BN)		(Northeastern at the YMCA) (BY)
19	Boiler Plant	54	Huntington Plaza
11	Cabot Physical Education Building (CB) TTY: Rm 110		(271 Huntington Avenue) (HN)
39	Cahners Hall (CA) TTY: Rm 151	10	Hurtig Hall (HT)
28	Cargill Hall (CG)	26	Kariotis Hall (KA)
13	Churchill Hall (CH)	41	Kerr Hall (Faculty Center) (KH)
59	Columbus Place	29	Knowles Center (KN)
	(716 Columbus Avenue) (CP)	25	Lake Hall (LA) TTY: Rm 203
56	Cotting School (CT)	57	Matthews Arena (MA)
9	Cullinane Hall (CN)	58	Matthews Arena Annex (MX)
40	Cushing Hall (CU)	20	Meserve Hall (ME) TTY: Rm 305
14	Dana Research Center (DA)	5	Mugar Life Science Building
27	Dockser Hall (DK) TTY: Rm 107		(Peabody Health Professions Center) (MU)
6	Dodge Hall (DG)	18	Nightingale Hall (NI) TTY: Rm 125
3	Ell Student Building (Auditorium) (EL) TTY: Rms 04,104	31	Parker Building (PA)
4	Ell Student Center (Student Lounge) (EC) TTY: Rm 255	2	Richards Hall (RI) TTY: Rms 150, 254
16	Forsyth Building (FR) TTY: Rms 100, 135	8	Robinson Hall (RB)
17	Forsyth Building Annex (FA)	21	Ryder Hall (RY) TTY: Rms 170, 180, 251, 270
38	Forsyth Dental Building (FE)	15	Snell Engineering Center (SN) TTY: Rm 120
1	Hayden Hall (HA) TTY: Rms 120, 202	60	Snell Library (SL) TTY: Reference Desk
33	Hillel-Frager (HF)	50	122 St. Stephen Street (SS)
24	Holmes Hall (HO) TTY: Rm 276	30	Stearns Center (ST) TTY: Rm 302
55	236 Huntington Avenue (HU)	32	26 Tavern Road (TA)

Residence Buildings

34	Burstein Hall	45	Loftman Hall and 153 Hemenway Street
43	Kennedy Hall	42	Melvin Hall
46	142-148 Hemenway Street	35	Rubenstein Hall
45	153 Hemenway Street and Loftman Hall	44	Smith Hall
7	316 Huntington Avenue	49	Speare Hall
	(Northeastern at the YMCA)	48	Stetson East TTY (public)
52	319 Huntington Avenue	47	Stetson West
51	337 Huntington Avenue	50	106/110/116/122 St. Stephen Street
36	407 Huntington Avenue	23	Willis Hall
41	Kerr Hall	37	White Hall
53	Light Hall	61	400 The Fenway

Academic Calendar 1994–1995

1994

September	5	Monday	Labor Day. University closed.
	6–9	Tuesday–Friday	Summer final examinations for undergraduate day colleges.
	12–16	Monday–Friday	Division B vacation
	13	Tuesday	Fall commencement
	16–20	Friday–Tuesday	Orientation and registration for freshmen and transfer students.
	19	Monday	Upperclass registration (Division B) 8:30 AM
	21	Wednesday	Classes begin in undergraduate day colleges for fall quarter at 8 AM
<hr/>			
October	10	Monday	Columbus Day. University closed.
<hr/>			
November	11	Friday	Veterans Day. University closed.
	24	Thursday	Thanksgiving Day. University closed.
	24–26	Thursday–Saturday	Thanksgiving recess. University closed except key offices.
<hr/>			
December	9–15	Friday–Thursday	Fall final examinations for undergraduate day colleges.
	16–Jan. 2	Friday–Monday	Christmas vacation. University closed except key offices.

1995

January	2	Monday	New Year's Day observed. University closed.
	3–4	Tuesday–Wednesday	Orientation and registration for new freshmen and transfer students; registration for continuing September freshmen and returning upperclass students (Division A).
	5	Thursday	Classes begin in undergraduate day colleges for winter quarter at 8 AM.
	16	Monday	Martin Luther King, Jr.'s Birthday observed. University closed.
<hr/>			
February	20	Monday	Presidents' Day. University closed.
<hr/>			
March	20–25	Monday–Saturday	Winter final examinations for undergraduate day colleges.
	27–April 1	Monday–Saturday	Division A vacation.
<hr/>			
April	3–4	Monday–Tuesday	Orientation and registration for new freshmen and transfer students, continuing September and January freshmen, and returning upperclass students (all seniors and Division B).
	5	Wednesday	Classes begin in undergraduate day colleges for spring quarter at 8 AM.
	17	Monday	Patriots' Day. University closed.
<hr/>			
May	29	Monday	Memorial Day. University closed.

June	12–16	Monday–Friday	Spring final examinations for undergraduate day colleges.
	17	Saturday	Commencement.
	19–23	Monday–Friday	Division B vacation.
	26	Monday	Registration for Divisions A and D and January freshmen (Quarter 3).
	27	Tuesday	Classes begin in undergraduate day colleges for summer quarter at 8 AM.
<hr/>			
July	4	Tuesday	Independence Day. University closed.
<hr/>			
September	4	Monday	Labor Day. University closed.
	5–8	Tuesday–Friday	Summer final examinations for full-time undergraduate programs.
	11–15	Monday–Friday	Division A vacation.
	12	Tuesday	Fall Commencement.
	15–19	Friday–Tuesday	Beginning of 1995–1996 academic year. Orientation, advising, and registration continues for new students and returning Division A students.
	20	Wednesday	Classes begin in undergraduate day colleges for fall quarter at 8 AM.

Calendar dates are subject to change. The University community will be notified if such changes are necessary.

Registrar's Quarterly Registration Calendar

Fall 1994

September 18–December 15

Course registrations	May 12, July 7	7:30 AM	Ell Ballroom
Drop/add	May 31, June 1 September 7, 8	9:00–3:00 9:00–7:00	
University registration		You must sign "I'm Here"	
New students	September 16	1:00–4:00	
Returning students	September 19 September 20*	9:00–12:00 9:00–4:00	
Drop/add	September 19 September 20 September 21, 22, 23, 26, 27	9:00–12:00 9:00–4:00 9:00–3:00	
Classes begin	September 21	8:00 AM	
W grades	October 14 November 18	Last day to drop without a W grade Last day to drop with a W grade	
Reading days	December 7, 8		
Final exam week	December 9–15		
Grades due	December 19	All grades mailed the following day	

Winter 1995

January 3–March 24

Course registrations	May 26, October 27	7:30 AM	Ell Ballroom
Drop/add	June 9, 10, November 16, 17 December 12, 13	9:00–3:00 9:00–7:00	
University registration and drop/add	January 3 January 4*	You must sign "I'm Here" 11:00–3:00 9:00–4:00	
Drop/add continues	January 5, 6, 9–11	9:00–3:00	
Classes begin	January 5	8:00 AM	
W grades	January 20 February 24	Last day to drop without a W grade Last day to drop with a W grade	
Final exam week	March 20–24		
Grades due	March 28	All grades mailed the following day	

*If you do not sign "I'm Here" and clear any registration blocks by this date, your course registrations will be cancelled at 4:00 PM.

Spring 1995	April 3–June 16		
Course registrations	November 10, January 26	7:30 AM	Ell Ballroom
Drop/add	November 29, 30 February 15, 16 March 23, 24	9:00–3:00 9:00–3:00 9:00–7:00	
University registration and drop/add	April 3 April 4*	You must sign "I'm Here" 11:00–3:00 9:00–4:00	
Drop/add continues	April 5–7, 10, 11	9:00–3:00	
Classes begin	April 5	8:00 AM	
W grades	April 21 May 26	Last day to drop without a W grade Last day to drop with a W grade	
Classes end for seniors	June 2		
Senior grades due	June 5		
Final exam week	June 12–16		
Commencement	June 17		
Grades due	June 20	All grades mailed the following day	
Summer 1995	June 26–September 8		
Course registrations	February 16, April 20	7:30 AM	Ell Ballroom
Drop/add	March 8, 9, May 10, 11 June 15, 16	9:00–3:00 9:00–7:00	
University registration and drop/add	June 26*	You must sign "I'm Here" 9:00–4:00	
Drop/add continues	June 27–29, July 3, 5, 6	9:00–3:00	
Classes begin	June 27	8:00 AM	
W grades	July 13 August 17	Last day to drop without a W grade Last day to drop with a W grade	
Classes end for seniors	August 31		
Senior grades due	September 5		
Final exam week	September 5–8		
Commencement		September 12	

*If you do not sign "I'm Here" and clear any registration blocks by this date, your course registrations will be cancelled at 4:00 PM.

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The *Northeastern University Undergraduate Catalog Full-Time Day Programs* contains the University's primary statements about these academic programs and degree requirements, as authorized by the president or Board of Trustees. For information about other academic policies and procedures; student responsibilities, academic and cocurricular life; faculty rights and responsibilities; or general personnel policies, benefits, and services, please refer to the *Academic Operations Manual*, *Undergraduate and Graduate Student Handbook*, *Cooperative Education Handbook*, *Faculty Handbook*, *Benefits and Services Handbook*, and related procedural guides as appropriate.

Accreditation. Northeastern University is accredited by the New England Association of Schools and Colleges, Inc.

Delivery of Services. Northeastern University assumes no liability for delay or failure to provide educational or other services or facilities due to causes beyond its reasonable control. Causes include, without limitation, power failure, fire, strikes by University employees or others, damage by natural elements, and acts of public authorities. The University will, however, exert reasonable efforts, when it judges them to be appropriate, to provide comparable services, facilities, or performance; but its inability or failure to do so shall not subject the University to liability.

The *Northeastern University Undergraduate Catalog* contains current information about the University calendar, admissions, degree requirements, fees, and regulations; however, such information is not intended and should not be regarded to be contractual.

Northeastern University reserves the sole right to promulgate and change rules and regulations and to make changes of any nature in its program, calendar, admissions policies, procedures, and standards, degree requirements, fees, and academic schedule whenever necessary or desirable, including, without limitation, changes in course content and class schedule, the cancellation of scheduled classes and other academic activities, and the substitution of alternatives for scheduled classes and other academic activities. In any such case, the University will give whatever notice is reasonably practical.

Northeastern University will endeavor to make available to its students a fine education and a stimulating and congenial environment. However, the quality and rate of progress of an individual's academic career and professional advancement upon completion of a degree or program are largely dependent on his or her own abilities, commitment, and effort. In many professions and occupations there are also requirements imposed by federal and state statutes and regulatory agencies for certification or entry into a particular field. These requirements may change while a student is enrolled in a program and may vary from state to state or country to country. Although the University stands ready to help its students find out about requirements and changes in them, it is the student's responsibility to initiate the inquiry.

Tuition Default. In cases where the student defaults on his/her tuition, the student shall be liable for the outstanding tuition and all reasonable associated collection costs incurred by the University, including attorneys' fees.

Emergency Closing of the University. Northeastern University has made arrangements to notify students, faculty, and staff by radio and television when it becomes necessary to cancel classes because of extremely inclement weather. AM radio stations WBZ (1030), WEEI (590), WHDH (850), WRKO (680), and FM stations WBMX (98.5) and WFNX (101.7) are the radio stations authorized to announce the University's decision to close. Television stations WBZ-TV4, WCVB-TV5, and WHDH-TV7 will also report cancellations. Since instructional television courses originate from live or broadcast facilities at the University, neither the classes nor the courier service operate when the University is closed. Please listen to the radio or television to determine whether the University will be closed.

If a storm occurs at night, the announcement of University closing is given to the radio stations at approximately 6 AM. Classes are generally canceled for that entire day and evening at all campus locations unless stated otherwise. When a storm begins late in the day, cancellations of evening classes may be announced. This announcement is usually made between 2-3 PM.

Equal Opportunity Policy. Northeastern University does not discriminate on the basis of race, color, religion, sex, sexual orientation, age, national origin, disability, or veteran status in admission to, access to, treatment in, or employment in its programs and activities. In addition, Northeastern University will not condone any form of sexual harassment. Handbooks containing the University's nondiscrimination policies and its grievance procedures are available in the Office of Affirmative Action, 175 Richards Hall. Inquiries regarding the University's nondiscrimination policies may be directed to:

Ellen S. Jackson, Dean/Director
Office of Affirmative Action
175 Richards Hall
Northeastern University
Boston, Massachusetts 02115
617-373-2133

Inquiries concerning the application of nondiscrimination policies may also be referred to the Regional Director, Office for Civil Rights, United States Department of Education, J.W. McCormack Building, Post Office Court House, Room 222, Boston, Massachusetts 02109-4557.

Family Educational Rights and Privacy Act. In accordance with the Family Educational Rights and Privacy Act of 1974, Northeastern University permits its students to inspect their records wherever appropriate and to challenge specific parts of them when they feel it is necessary to do so. Specific details of the law as it applies to Northeastern are printed in the Undergraduate and Graduate Student Handbook and are distributed annually at registration of the University's colleges and graduate schools.

Persistence Rates under the Student Right-to-Know Act. In the fall of 1993, the persistence rate for students who entered in the fall-1992 cohort was 70.8 percent.

Mission Statement. Northeastern University is dedicated to providing a diverse student population with an academic program and a course of professional preparation of the highest quality. The University values equally knowledge for its own sake, knowledge as a means to success in the workplace, and knowledge as a cornerstone of personal achievement and satisfaction. As a private, urban university, Northeastern is determined to maintain its reputation as a friend to the city of Boston and a partner of the Commonwealth of Massachusetts.

NORTHEASTERN UNIVERSITY



1995
Undergraduate Catalog Full-Time Day Programs
1996

Northeastern University

**Undergraduate Catalog
Full-Time Day Programs**

1995–1996

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*Courses in Health, Sport, and Leisure Studies are administered through the Bouvé College of Pharmacy and Health Sciences. Students matriculated for a degree in this area prior to the time of consolidation may, until June 1997, opt to receive the degree from the Bouvé College of Human Development Professions.

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The University

Learning about Northeastern

Admission

The Office of Undergraduate Admission encourages prospective students to learn more about Northeastern University. For more information on the following programs, or to receive additional publications, contact the office at 617-373-2200 (voice), 617-373-4019 (TTY), or 617-373-8780 (fax). Or write: Office of Undergraduate Admission, 150 Richards Hall, Northeastern University, Boston, Massachusetts 02115. You may also access our Home Page on the Internet at <http://www.neu.edu>.

Information sessions. Sessions are scheduled at 10:00 AM and 2:00 PM, Monday through Friday, year round (except for legal holidays). They include presentations by an admission counselor, an informal question-and-answer period, and a multimedia presentation. Sessions are also held on Saturday mornings from September through June.

Interviews. All prospective students are encouraged but not required to schedule a personal interview. The interview allows students to meet with an admission counselor and to learn more about the University's academic and cooperative education programs.

Guided tours. Student-guided tours of the campus are held Monday through Friday and on Saturday mornings from September through June. During July and August tours are held on Monday through Friday. Tours begin at 9:00 AM and leave on the hour, with the final tour at 3:00 PM. No appointments are necessary for either the information sessions or tours.

College visit program. Prospective students and their parents have the opportunity to visit any one of the undergraduate colleges and schools through the college visit program. Visits are scheduled so that prospective students and their parents may participate in the information session and university tour on the same day.

Open houses. During the fall, late winter, and early spring, each of Northeastern's undergraduate colleges invites prospective students and their parents to an open house. Representatives of various University departments provide information about admission, cooperative education, student financial services, residential life, student activities, and the University libraries, among other areas.

Northeastern University admits qualified freshmen and transfer students to all programs in September and January. In most programs, transfer students also may apply for entrance at the beginning of the March and June quarters.

Rolling admission. Decisions on admission are made as soon as all required credentials (including first marking-period senior grades and SAT or ACT test scores) have been submitted and reviewed. In all cases of acceptance, candidates must complete their senior year of high school. Admission is selective and priority is given to candidates who apply by March 1.

Early admission—juniors, second-semester seniors. In certain cases, students may enroll at Northeastern before graduating from high school. Such students may enroll in either September or January, thereby reducing by one year the time to complete degree requirements. The endorsement of the student's school principal or guidance counselor is required for early admission.

Deferred admission. Accepted students who wish to participate in the deferred admission plan will be asked to describe the activities they plan for the year preceding enrollment. Students may choose this plan for reasons such as travel, health problems, or work. Students granted deferred admission will be required to place a \$200 tuition deposit to secure their position.

Required deposits. Students who are accepted to the University are asked to submit a nonrefundable tuition deposit of \$200 by May 1. This deposit indicates intent to enroll and is applied to the first-quarter tuition account. Students applying for entrance dates other than September should note the required deposit date on their letter of acceptance. For additional information about deposits required for international students, refer to the International Students section on page 4.

Students requesting on-campus housing must submit a nonrefundable \$400 deposit (in addition to the \$200 tuition deposit) along with a completed housing application. Information about this required nonrefundable deposit is mailed by the Department of Residential Life to all admitted students following acceptance.

Admission Policies

Entrance Requirements

Ideally, applicants have completed an academically challenging secondary school program—one that includes courses in English, mathematics, laboratory science, history, and a foreign language. Candidates should also have read broadly outside of class and developed an ability to communicate ideas effectively. Achievement in secondary school is the best single predictor of academic success in college. This factor, together with recommendations from the student's school counselor, and Scholastic Assessment Test (SAT) or American College Testing Program (ACT) test results, weighs most heavily in the evaluation process.

Secondary School Preparation

Arts, humanities, and social sciences. Students who plan to major in art, theatre, English, foreign languages, music, philosophy, and speech communication should have demonstrated ability in these areas during high school. Candidates who plan to pursue careers in anthropology, economics, history, human services, linguistics, political science, psychology, or sociology should have a well-rounded background in the social sciences. Applicants to the School of Journalism should have worked on writing and producing high school publications or audio- or videotape productions.

Students seeking certification as teachers in early childhood education or elementary education or those planning to major in human services should have demonstrated interest in the behavioral, social, and human sciences.

Business administration. Candidates must have completed a strong preparatory program that emphasized the humanities, social sciences, and natural sciences. Applicants also must have had several years of mathematics, including geometry and Algebra 1 and 2.

Computer science, engineering, mathematics, nursing, pharmacy and health sciences, and sciences. Applicants are encouraged to complete a full sequence of science and mathematics courses. In science, such a sequence usually includes a year of study and laboratory work in biology, chemistry, and physics; and, in mathematics, the sequence includes geometry, Algebra 1 and 2, and a fourth year of trigonometry and/or analysis. Math and science majors also need courses in the social sciences and humanities.

Criminal justice. Applicants should have demonstrated the ability to succeed in their study of the behavioral, social, and human sciences.

Engineering technology. Applicants are encouraged to complete a full sequence of mathematics, including geometry, Algebra 1 and 2, and analysis; and a full year of study and lab work in a natural science. Candidates also need courses in the social sciences and humanities.

Entrance Examinations

Freshmen must take the Scholastic Assessment Test (SAT) of the College Board or the American College Testing Program (ACT). Results of these tests may be sent directly to the admission office. The College Board code number for Northeastern University is 3667. When evaluating candidates' SAT scores, the admission office will combine the best verbal and math components, regardless of test date. For more information, consult a school guidance counselor or write directly to The College Board, P.O. Box 592, Princeton, NJ 08540 or P.O. Box 1025, Berkeley, CA 94701. Or write to American College Testing Program, P.O. Box 168, Iowa City, IA 52243.

English-as-a-Second-Language Proficiency Requirement

Before being considered for admission, students whose native language is not English are required to demonstrate English language proficiency. This can be done by submitting the results of the College Board's Test of English as a Foreign Language (TOEFL), by successfully completing an approved English-as-a-second-language course of study, or by receiving B– or above in English courses in English-speaking high schools.

Before they are allowed to enroll in academic coursework, all students whose first language is not English and who score below 550 on the TOEFL (or its equivalent on another examination) must take the English Proficiency Test administered by the University's English Language Center. The results of this test are used to assign students to appropriate English courses.

Advanced Placement

The University grants advanced placement credit to applicants with a score of 3 or better in their advanced placement examinations. Applicants may take the tests in art (history, studio—general, studio—drawing), biology, chemistry, computer science (A, AB), economics (microeconomics, macroeconomics), English (language, literature), French (language, literature), German (language), government and politics (comparative, United States), history (European, United States), Latin (Virgil, Catullus–Horace), mathematics (calculus AB, BC), music (theory), physics (BC mechanics–C electricity, magnetism), and Spanish (language, literature). Applicants who wish to submit scores for advanced placement are required to take the Advanced Placement Tests of the College Board in May.

College-Level Examination Program

The University cooperates with the College Board in its College-Level Examination Program. CLEP provides a national program to evaluate nontraditional college-level education. Northeastern will grant college credit to qualified students according to their CLEP scores. Northeastern is a designated CLEP Testing Center. For more information, contact the Counseling Center at 302 Ell Student Center, 617-373-2142.

Health Requirements

The Lane Health Center's Pre-entrance Physical Examination Form is sent to each student following acceptance to Northeastern. Completion of this form is considered a condition of enrollment. Each student must return the completed form, which includes a medical history, documentation of a recent physical exam, and a tuberculin test, within six months of registration.

State law requires medical documentation of appropriate immunization against measles (two vaccinations), mumps, rubella, tetanus, and diphtheria. Both a rubella and a varicella titre are mandatory for the health professions (medical laboratory science, nursing, pharmacy and health sciences, radiology, and physical therapy). Tuberculin tests are required annually for nursing students and within three months prior to the practicum for student teachers. A positive titre for Hepatitis B is required prior to beginning any clinical assignments, internships, or cooperative education quarters for all undergraduate students deemed at risk by their departments and in pharmacy and health sciences and nursing.

In accordance with Section 504 of the Rehabilitation Act of 1973, applications for admission are judged on the basis of qualification, not on the absence or presence of a medical or disabling condition. Any adjustments needed for such applicants are made to ensure access to college life, both academic and extracurricular.

How to Apply

All Students

The application process for all students follows. Refer to the International Students section and the Transfer Students section for additional requirements.

- Complete and sign the application form.
- Enclose the nonrefundable \$40 application fee. Make checks payable to Northeastern University. This fee may be waived in cases of extreme hardship as endorsed by the candidate's secondary school counselor or social worker.
- Mail the application form and the check to the Office of Undergraduate Admission, 150 Richards Hall, Northeastern University, Boston, Massachusetts 02115.
- Arrange for transcripts and required test scores—Scholastic Assessment Test (SAT) or American College Testing Program (ACT)—to be sent to the University. Transfer students who have completed two years of college (more than sixty credit hours) are not required to submit test scores.
- For priority consideration, applications should be submitted by March 1.

International Students

The University welcomes qualified students from other countries. At present, nearly 2,500 international students from more than 115 countries attend Northeastern. The University is authorized under federal law to enroll nonimmigrant aliens as full-time students in degree-granting programs.

In addition to the application process described above, international students must complete the following.

- Submit the Supplementary Form with the application.
- Submit the Declaration and Certification of Finances Form with the application.
- Submit the same credentials as U.S. citizens. All credentials must be official documents or certified true copies. Credentials in languages other than English must be accompanied by certified literal English translations. Applicants with previous university-level studies should submit official course descriptions or syllabi for all coursework completed.
- Request the testing agency to submit the official results of the Test of English as a Foreign Language (TOEFL). If these scores are not available at the time of application, it is the responsibility of the international applicant to take the test at the first available opportunity and have the results submitted as soon as possible. An application is considered incomplete until this credential is received. A student who attends and successfully completes the course of study offered by Northeastern University English Language Center (ELC) and obtains a "Pass" or a "Release" from the ELC is not required to submit TOEFL scores.
- Request the testing agency to submit the official results of the Scholastic Assessment Test (SAT). If these scores are not available at the time of application, it is the responsibility of the international applicant to take the test at the first available opportunity and have the results submitted as soon as possible. An application is considered incomplete until this credential is received. An applicant who has successfully completed two years or the equivalent of full-time university level study (60 credit hours) is not required to submit SAT scores.
- After acceptance, submit the required nonrefundable tuition deposit of \$200. Upon receipt of the tuition deposit, a Certificate of Eligibility (I-20 form or IAP-66 form) will be issued.
- If students are transferring to Northeastern from another college or university in the United States, one of the following is required. Students returning home before entering Northeastern must re-enter the United States on the I-20 or IAP-66 issued by the University. Students not returning home must present the Northeastern-issued I-20 or IAP-66 to the International Students Office during registration and orientation.

The University considers awarding advanced standing credit to students whose secondary-school education exceeds the requirements met by students in the American educational system. The University recognizes the advanced level of academic preparation offered by the International Baccalaureate. Up to one year of credit is generally granted for scores of 5, 6, or 7 on higher-level examinations, as applicable to the degree being pursued.

Transfer Students

Students who have completed one or two years of study in an accredited college, university, or technical institute or have earned an associate's degree from an accredited junior college or other two-year program may seek admission as an upperclass student.

Basic requirements. Transfer applicants must have achieved a satisfactory college record—appropriate to the course of study they wish to pursue—at another institution. Credit is generally granted toward a Northeastern degree for a grade of C (2.0) or better in any reasonably equivalent course completed at another accredited institution. Candidates must be in good standing and must be eligible to continue in the institution they are currently attending.

Northeastern University uses the quarter calendar and awards quarter hours of credit for courses that are successfully completed. Each quarter hour (QH) of credit is equivalent to three-quarters of one semester hour. Most Northeastern courses are equivalent to three semester hours of credit or four quarter hours. Students who successfully complete 48 quarter hours generally qualify for sophomore standing, 80 for middler, 112 for junior, and 148 for senior. All upperclass course selection for transfer students is planned with their faculty advisers.

Application procedure. Transfer applicants should follow the application process described on page 4, with the exception that the SAT or ACT is waived for students who have completed 60 credit hours of college work successfully. In addition, transfer candidates must

- indicate their choice of college and major on the application
- request that an official copy of their high school transcript be sent to the Office of Undergraduate Admission
- request that an official transcript from each college attended be sent to the Office of Undergraduate Admission directly from the registrar's office of the respective colleges
- submit a list of courses in progress for the current academic year (including course number, course title, and number of credits to be earned in each course)
- demonstrate English language proficiency if their first language is not English. See page 3 for details about fulfilling this requirement

Transfer candidates should apply by March 1 for priority consideration. Applications will be reviewed on a space-available basis after that date.

Cooperative Education

Robert E. Vozzella, EdD, *Vice President*
 Candace A. Herene, BA, *Assistant Dean*
 Patricia A. Venter, BS, *Diversity Coordinator*

Associate Professors

Betsey W. Blackmer, PT, EdD
 Richard L. Canale, MEd, CAGS
 Elizabeth A. Chilvers, MEd
 Kathleen L. Finn, EdD, RN
 Joyce K. Fletcher, MEd, DBA
 Mary R. Flynn, MEd, RN
 Stephen M. Kane, EdD
 Ann C. Noonan, PT, EdD
 Melvin W. Simms, EdD
 Robert R. Tillman, EdD

Assistant Professors

Michael A. Ablove, MEd
 Donald L. Eastridge, MDiv
 Ann M. Galligan, EdD
 John C. Mulhall, MS
 Veronica L. Porter, MEd
 John A. Saltmarsh, PhD
 William A. Sloane, MBA

Associate Cooperative Education Coordinators

Charles Bognanni, MEd
 Rosemarie DiMarco, MS
 Jean F. Egan, MEd
 Theresa A. Harrigan, EdD
 Barbara L. Lechner, MEd
 Donna R. Smith, MA, MEd
 Gary M. Somers, MA
 Martha L. Wengert, MEd
 William E. Wray, JD

Assistant Cooperative Education Coordinators

Patrice Brown, MA
 Jananne Cannon, MBA
 Lisa M. Cantwell, MA
 Terry H. Chapman, PhD
 Jacqueline Diani, MEd
 Ellen Duwart, MEd
 Patrick Hickox, MArch
 Karen P. Kelley, MEd
 Jill E. Lacey, MS
 Susan H. Lavoie, MEd
 Helen C. Mann, MEd
 Kellianne Murphy, MA
 Jacqueline F. Sweeney, MS
 Nancy Waggner, JD
 Felicia P. Wiltz, MEd
 Mark L. Yorra, RPh, MS

Cooperative education is based on the principle that what students learn in the workplace is a valuable complement to what they learn in the classroom. For most programs, cooperative education is a degree requirement. The University assists in providing relevant cooperative education experiences and attempts to integrate these experiences into the students' total academic program. The success of the program, however, ultimately depends on student interest and commitment and the cooperation of educators and employers.

Studies show that reinforcing classroom learning with job responsibilities increases a student's motivation and self-confidence. Greater interest in academic work develops when students are able to see the link between co-op experiences and classroom study. Co-op students have opportunities to evaluate career decisions early in their college years, while gaining meaningful work experience before graduation and establishing valuable professional contacts and references. Students also earn experiential learning credit by satisfactorily completing the required components of the cooperative education learning process. The salaries students earn in cooperative education experiences may also help defray a portion of the costs of their education.

Participation in co-op is required of all students except those in the College of Arts and Sciences. Even so, most arts and sciences students nonetheless choose to take advantage of co-op.

Cooperative education curricula leading to the baccalaureate degree generally require five years at Northeastern University. Programs typically consist of a freshman year of three consecutive quarters of full-time study followed by four upperclass years in which students alternate periods of classroom study with cooperative education experiences. The colleges of Engineering, Business Administration, and Computer Science also offer a four-year co-op option.

Responsibility for all phases of the co-op program rests with a faculty coordinator who assists students in deriving maximum benefits from their education at Northeastern. In general, co-op experiences become increasingly challenging and career-specific as students continue their education and acquire greater skills.

Students are not limited to paid employment during a cooperative period. They may wish to pursue a wide variety of experiential learning activities such as travel abroad, volunteer work, or taking specialized courses at another institution.

**International
Cooperative Education**

The Office of International Cooperative Education offers a variety of services to international students as well as to U.S. citizens. Through the International Exchange Program, undergraduates may be placed abroad for their cooperative work experience. Placements abroad are currently available in the United Kingdom, Ireland, France, Spain, Germany, Austria, the Netherlands, Sweden, Australia, and Israel for students who have the appropriate background and experience.

International students may receive assistance on matters relating to their co-op employment, such as Social Security and tax information, as well as on issues involving the verification of their immigration and co-op status. A special course, Working in the U.S., is offered to international students to help prepare them for co-op. Additionally, new opportunities may enable some international students to return to their home countries to work for American companies on co-op, especially those countries located in the Pacific Rim region.

Academic Policies

This section presents general information about what is expected of students and how progress toward matriculation is measured. For specific details on their individual degree programs, students should consult their academic advisers.

The University assumes no liability for any delay in providing or failing to provide educational or related services or facilities due to causes beyond the reasonable control of the University. Causes include, but are not limited to, power failure, fire, strikes by University employees or others, weather damage, and acts of public authorities. However, when in its judgment it is appropriate to do so, the University will exert reasonable efforts to provide comparable or substantially equivalent services, facilities, or performance; but its inability or failure to do so shall not subject it to liability.

No faculty member, administrator, or other representative of the University shall make any representations to, or enter into any agreements with, or act toward any student or other person in any manner that is not in conformity with established University policies, practices, and procedures as expressed in this or any other official University document.

Summer Orientation

Summer orientation is a mandatory program for all new students and transfer students who will begin their studies at Northeastern University in the fall quarter. It is a valuable opportunity to prepare for a successful academic career and to make friends with students in your entering class. During the months of July and August, new students and transfer students will attend one of ten orientation sessions designed to meet their particular needs. Seven of the sessions are designated for new students and three of the sessions are designated for transfer students. Each of Northeastern's nine schools and colleges is assigned to specific sessions. Participants will attend a session hosted by the school or college to which they have been admitted.

The summer orientation staff includes orientation leaders, students who will serve as valuable sources of information and assistance throughout the program. In addition to the orientation leaders, staff and faculty from various campus offices and your college will be available to answer questions and provide assistance in making arrangements for the fall. During summer orientation, participants will complete placement exams, meet with representatives from their school or college to develop a fall class schedule, register for classes, and obtain a student identification card. Participants will also learn about life at Northeastern including services and opportunities that will assist with their transition to the University. In addition, participants will be able to contract for food service and campus housing. The schedule also includes opportunities to tour the campus and participate in activities with other students. Student participants will stay in a residence hall during summer orientation. Parents will participate in a separate but parallel program and will also be invited to stay in a residence hall during this session. Registration information will be mailed to incoming students who pay their tuition deposit. See page 17 for summer orientation fee information.

Attendance Requirements

The University expects students to meet attendance requirements in all courses to qualify for credit. Attendance requirements vary; it is the student's responsibility to ascertain what each instructor requires.

Failure to meet attendance requirements may force a student to drop the course, as recommended by the instructor and with the approval of the Academic Standing Committee of the college.

Classes for day students are scheduled from 8:00 AM to 5:10 PM, Monday through Friday. Students should not make conflicting commitments until the class schedules for each quarter are final. Schedule changes to accommodate part-time work are difficult and rarely made.

Permission to make up work may be granted by instructors for reasonable cause. Requests must be made immediately upon a student's return to class. Laboratory work can be made up only during the hours of regularly scheduled instruction.

Absence because of student activities. If students must miss classes to participate in athletic contests or other forms of scheduled intercollegiate activity, they are entitled to make-up privileges. Faculty members may require a written statement from the administrator in charge of the activity.

Absence because of illness. A student who is absent from school for an extended period of time must inform the dean of students and his or her college by letter, message, or telephone.

Absence because of religious beliefs. The University maintains the following guidelines regarding student absences because of religious beliefs. "Any student who is unable, because of his/her religious beliefs, to attend classes or to participate in any examination, study, or work requirement shall be provided with an opportunity to make up such examination, study, or work requirement

that he/she may have missed because of such absence on any particular day; provided, however, that such make-up examination or work shall not create an unreasonable burden upon such school. No fees of any kind shall be charged by the institution for making available to the said student such opportunity. No adverse or prejudicial effects shall result to any student because of availing himself/herself of the provisions of this section" (Massachusetts General Laws, Chapter 151C, Section 2B, 1985).

Absence because of jury duty. Members of the University community are expected to fulfill their obligations to serve on a jury if called upon. A student selected for jury duty should inform his or her instructors and/or activity advisers. They will provide a reasonable substitute or compensatory opportunities for any required work missed. Absence will not be penalized in any way.

Class Schedule

All classes start promptly according to the class schedule shown. Students take classes grouped in sequences, as shown in the following chart. Most of the classes at Northeastern are scheduled in the time periods listed during the fall, winter, and spring quarters.

Students may leave fifteen minutes past the scheduled opening of class if the instructor is not present. Students are expected to be punctual. Students who are late for classes should attend for the balance of the period. Instructors will not tolerate habitual tardiness.

Fall, Winter, and Spring Schedule

Business Students	Sequence 1	MWTh	8:00–9:05
	Sequence 2	MWTh	9:15–10:20
	Sequence 3	MWTh	10:30–11:35
	Sequence 4	MTTh	1:35–2:40
	Sequence 5	MTTh	2:50–3:55
	Sequence 6	MTTh	4:05–5:10
	Sequence 7	TF	8:00–9:05
		W	1:35–2:40
	Sequence 8	TF	9:15–10:20
		W	2:50–3:55
	Sequence 9	TF	10:30–11:35
		W	4:05–5:10
	Sequence 10	TWF	11:45–12:50
	Sequence A	MW	8:00–9:40
	Sequence B	W	1:45–3:25
		F	8:00–9:40
	Sequence C	MW	9:55–11:35
	Sequence D	TF	11:45–1:25
	Sequence E	TTh	1:45–3:25
	Sequence F	W	3:30–5:10
	F	9:55–11:35	
Sequence G	TTh	3:30–5:10	
Sequence H	M	3:30–5:10	
	F	1:45–3:25	
Sequence I	M	1:45–3:25	
	W	11:45–1:25	
Sequence J	TTh	9:55–11:35	
Sequence K	TTh	8:00–9:40	

Grading System

Activities hours. Undergraduate activities hours are Monday and Thursday, 11:45 AM–1:25 PM during fall, winter, and spring quarters. Summer activities hours are Wednesday, 11:45 AM–12:50 PM. No classes or other academic functions are held during these hours. Violations of this regulation should be reported to the Office of the Dean of Students or to the Office of Student Government.

Grades are officially recorded by letters, evaluated as follows.

Grades	Numerical equivalent	Status
A	4.000	Outstanding achievement
A–	3.667	
B+	3.333	
B	3.000	Good achievement
B–	2.667	
C+	2.333	
C	2.000	Satisfactory achievement
C–	1.667	
D+	1.333	
D	1.000	Poor achievement
D–	.667	
F	.000	
I		Incomplete in a letter-graded course
S		Satisfactory achievement in pass/fail course; counts toward degree requirements
U		Unsatisfactory achievement in pass/fail course
W		Course withdrawal
X		Incomplete in a pass/fail course

An I or X grade shows that the student has not completed the course requirements. An average grade of D or less is not acceptable and will not allow a student to continue at Northeastern University.

Individual faculty may choose not to use plus or minus designations. If faculty elect to use only whole letters, they must announce this to the class at the beginning of the quarter.

Quality-point average. Numerical equivalents for scholastic averages are weighted according to the number of hours the course carries. For example, a grade of A in a course carrying 3 quarter hours is weighted at 12. A grade of C in a course carrying 2 quarter hours is weighted at 4. The quality-point average for both courses would then be 12 plus 4, divided by 5, or 3.2. Grades of X, I, S, and U are not included in the calculation of the quality-point average.

Credit hours. Credit hours are assigned to a course based on the established educational standard that one credit hour is equal to approximately three hours of student learning time per week over a period of a quarter, semester, or term (usually one hour of lecture or discussion, plus two hours of individual study outside class). When much individual study is involved, as in directed study or certain graduate courses, each additional hour of credit should represent at least three hours of student work.

Transfer of credits. With the approval of the academic dean a student in one of the full-time day programs may take courses in University College, the School of Engineering Technology, graduate school, or the part-time engineering program and have those courses and grades recorded on the permanent record. Degree credit may be granted for transfer work from other institutions; students should check with the dean's office of their college.

Pass/fail system. The individual schools and colleges state how and when the pass/fail system may be used. An outline of the general system follows.

- Any student not on academic probation may, beginning in quarter four, register for one pass/fail course per quarter if permission is granted by the college in which the student is enrolled and if the course is offered on a pass/fail basis. Freshmen and upperclass students may take one-quarter-hour courses in physical education on a pass/fail basis in any quarter. Enrollment in these courses does not prevent upperclass students from electing an additional four-quarter-hour course on a pass/fail basis.

- Pass/fail courses are normally restricted to electives outside the major field. The college faculty, however, may choose to adopt the pass/fail system of grading when it appears pedagogically sound for required courses within a program.

- Individual faculty members may decide whether any of their courses may be taken on the pass/fail system of grading, except when uniformity is necessary. In such cases, the department and/or college faculty offering the course determine whether the pass/fail system is used.
- Grades recorded on the basis of the pass/fail system do not figure in the computation of the quality-point average. Satisfactory completion of all courses taken on the pass/fail system is designated on the student's permanent record by the letter S. Unsatisfactory work is designated by the letter U. Any unsatisfactory grade must be handled according to the existing policy of the college but must never be cleared through the election of the same course pass-fail, except when this system is the only one used by the college for grading the course.
- An incomplete in a course taken on a pass/fail basis is designated by the letter X on the permanent record and treated according to the normal procedure for incomplete grades.
- To use the pass/fail system students must meet all prerequisites for the course. They have until the end of the second week of the quarter to declare their intention to receive a pass/fail grade. This deadline may be extended to the end of the eighth week at the option of the instructor.

Quarterly status reports. Grades are mailed to students approximately three days after each quarter. A missing grade ("*" on grade report) means that none was turned in by the instructor. Take up the matter of a missing or erroneous grade directly with the instructor.

Dean's list. A dean's list, or honors list, is issued at the end of each quarter containing the names of students who have a 3.25 quality-point average or higher with no I grade or grade below C-. Students who are on any form of probation, who are enrolled in a course on a pass/fail basis (except where there is no alternative or where required by the program), or who are not carrying a full load as determined by their undergraduate college are not eligible. With a few exceptions as approved by the respective colleges, a full load is considered to be four courses or sixteen quarter hours.

Alternative-year freshmen are eligible for the dean's list when they become sophomores in one of the full-time day programs.

Procedure for clearing an I or changing other grades. An incomplete (I) grade may be reported by the instructor when a student has failed to complete a basic component of a required course, such as homework, a quiz or final examination, a term paper, or a laboratory project. Students can make up an I grade by satisfying the requirements of the instructor or, if the instructor is absent, the chair of the department. Be aware that instructors' policies on the granting of incomplete grades may vary, and that the final decision on an incomplete grade is up to the instructor. The period for clearing an I grade and for changing a grade other than an I or failure (F or U) is restricted to one calendar year from the date it is first recorded on the student's permanent record.

Freshmen with multiple course deficiencies, including incomplete (I) grades, do not have a calendar year's time to rectify the deficiencies.

Students who make up an I grade by taking a different course or repeating the same course will be given a new grade and billed accordingly.

To clear an I grade, a student must obtain a triplicate form on which the precise agreement for clearing an incomplete (I or X) grade is specified and which is signed by the student and the instructor. Forms are available in the department office. The student must make an appointment with the instructor to arrange for clearing the I grade. He or she must then complete the form, sign the agreement, and obtain the instructor's signature; leave a copy with the instructor, take one copy to the dean's office, and retain a copy as a personal receipt.

Any exception to this policy on change of grades must be recommended by the Academic Standing Committee of the college in which the course was offered and must be forwarded in writing by the dean to the registrar for implementation. (This process must be completed within one calendar year from the end of the quarter in which the course was offered.)

Commencing with grades given in the fall quarter of 1986, the University policy has been that any grade outstanding for twelve or more months cannot be changed.

Make up of deficiencies or failures. Students can make up failures by repeating the same course in the full-time day program. Both grades remain on the transcript but only the new grade is used for calculation of quality-point average. With permission from their dean's office, students may substitute an appropriate different course taken in the full-time day program or elsewhere. Credits earned elsewhere, including University College, are treated as transfer credits. Grades below C are not accepted for transfer credit.

Remedial/compensatory courses. Remedial/compensatory courses are currently offered for credit through different programs and colleges. While credit for remedial courses may be given, not all colleges or departments will apply these credits to major, distribution, or graduation requirements. Students should consult their advisers for specific information.

Examinations

Final examinations are held during the last week of each quarter. An examination schedule is posted at midterm on the registrar's official bulletin board. No examinations longer than one-half hour may be given in the week before final examinations. It is the student's responsibility to know the time and location of each of his or her examinations. Final exam conflicts, defined as two exams at the same hour or three exams in one day, will be resolved with the help of the scheduling office, 120 Hayden Hall, but only if reported before the last full week of classes.

A list of rules of conduct during examinations follows.

- Students must concentrate on their own work.
- Under no circumstances may a student communicate in any way with another student during an examination.
- Each student must work in a manner that does not bother other students.
- No unauthorized material is allowed in the examination room.
- Unless otherwise specified by the instructor and so understood by the head proctor, students who bring such materials as books, notebooks, and papers into a final-examination room must leave them either at the front or rear of the room or against the walls, at the option of the head proctor.
- All written material must be kept on the right arm of the chair. (In rooms with tables, materials are to be kept in front of students.)
- Proctors cannot answer questions about the examination material; students should ask questions that concern only possible typographical errors in the text or missing parts of the examination.
- No student may leave the room during the first thirty minutes of the examination. Late students may not enter the examination room if any other student taking the examination has already departed. Late students do not get extra time.
- Material may not be borrowed during the examinations.
- Students may leave the examination room permanently after thirty minutes have elapsed, but during the last ten minutes of the examination no one will be allowed to leave the room. Students remaining until the end of the examination must cease work immediately when the head proctor announces the close of the examination and must remain quietly seated until all examination materials have been collected.
- Students who become ill during an examination and are unable to complete the examination must report to the Lane Health Center immediately.
- Students must turn in all examination materials before leaving the room unless the instructor indicates that copies may be retained.
- With permission of the instructor, students may submit a stamped, self-addressed postcard with the final examinations in order to receive grades early.

Academic Progression Standards

Each college establishes academic progression standards for its own undergraduate students. To progress from one academic year to the next, students must meet the minimum quality-point average(s) (QPAs) and number of earned quarter hours required by their college/program. In addition, many programs require that specific courses be successfully completed to progress to the next year. Students who do not make satisfactory progress will not graduate with their class and may be withdrawn. For more information about academic progression standards for each college, program, or major, please refer to college guidelines which can be found either in individual college guidebooks or in the college sections of this *Undergraduate Catalog*, starting on page 30.

Academic eligibility for participating in student organizations. All students must have a minimum 2.0 overall grade point average in order to be eligible for an elected or appointed leadership position in any student organization.

Repeating classes to clear deficiencies. Students may, with approval, repeat a course or take a substitute course in the full-time day program to clear a deficiency. The final grade for this course replaces the former grade. Students who are repeating courses outside the full-time day program to raise their quality-point average or to clear a deficiency must attain an average of 2.0 in all repeated work.

Graduation Requirements

To be eligible to receive degrees, graduating students must clear all academic, financial, cooperative work, or disciplinary deficiencies. See individual programs for specific academic requirements for graduation.

Attendance at commencement is optional. Information concerning commencement is mailed to all graduating students during the spring quarter for June graduation or summer quarter for September graduation.

Seniors are notified by mail if they fail to qualify for their degrees. No special notice is sent to those who do qualify. Students who are in doubt should call their dean's office. The University has a residency requirement of a minimum of three full-time quarters at Northeastern immediately preceding graduation.

Graduation with honor and selection as the class marshal (June only) are reserved for students who have been registered as full-time students at Northeastern University for at least six quarters and for at least twelve quarter hours of coursework each quarter.

Quality-point average	Honor conferred
3.25–3.49	Graduation with honor (<i>cum laude</i>)
3.50–3.74	Graduation with high honor (<i>magna cum laude</i>)
3.75–4.00	Graduation with highest honor (<i>summa cum laude</i>)

Registration Procedures

Course prerequisites. Students are expected to meet prerequisites as listed in the course description of each course in which they enroll. Grades of F, U, I, X, or W in prerequisite courses do not normally fulfill requirements. Exceptions must be authorized by the academic department offering the course and be approved by the office of the dean of the student's college.

Declaring majors and minors. Undergraduate students generally declare their majors upon admission to the University or in the spring quarter of their freshman year. Majors are described under the various schools and colleges. Students may earn a minor in any undergraduate discipline that designates a minor. Students should declare their intent to earn a minor as early as possible, and no later than the end of the junior year, by applying to the minor department. During the final term, the department offering the minor ensures that it appears on the student's academic record shortly after graduation by informing the registrar of the completion of the minor.

Internal and external transfer students. To transfer to another college within Northeastern University or to change majors within the same college, students should contact the appropriate office for their academic level. Freshmen and upperclass students should consult the office of the dean of the college to which they want to transfer. A transfer to another college is not automatic but is based on a number of factors, including academic achievement and availability of space.

External transfer students are those who previously attended a college other than full-time day college at Northeastern. At the time of their admission, external transfers are identified as either freshmen with advanced standing or upperclass transfer students. Freshmen with advanced standing are those accepted with less than the equivalent of thirty-six quarter hours of transfer credit. They are included in the freshman class in quarter one, two, or three.

Upperclass transfer students have been accepted into a full-time day college with enough transfer credit to enable them to enter as sophomores, middlers, or juniors. Programs for upperclass transfers are generally planned with advisers in the offices of the department and dean.

Special students. Students not regularly enrolled in a full-time day college may, in certain instances, enroll on a quarter-by-quarter basis in some courses given in those colleges. Approval and further information must be obtained from the dean of the college offering the specific course.

Overload policies. Inasmuch as withdrawal from a course can be accomplished up to the eighth week, no rebate or credit is granted when a student voluntarily drops a course. An exception can be made if the withdrawal takes place during the first week, but a student should raise the issue at that time.

Students who enroll in overload courses will be billed at the overload rate, 1/16 of the tuition for that quarter, per quarter hour.

Any upperclass student taking a full course load may elect to take an additional enrichment course without charge. No credit is given for this course. The procedure for taking this course is as follows: Confer with your dean or his or her designee to establish eligibility under the conditions that this course will be a four-quarter-hour basic college course; be the only such tuition-free course permitted during the upperclass academic year; be in addition to the normal course load for the quarter; be on a space-available basis on registration day, with priority given to tuition-paying

students; not contribute to fulfilling degree requirements or to the calculation of the quality-point average or total earned hours.

Should you later petition to have credits earned in this course apply to your degree, you must: (a) obtain the approval of your dean or his or her designee; (b) pay tuition at the rate current at the time of petition; and (c) complete the process by May 1 of your senior year. After you and the dean or his or her designee have filled out and signed the necessary form, take the appropriate copy to the Office of the Registrar no later than the second week of the quarter.

Any student who registers for more quarter hours in a quarter than an existing curriculum allows is liable for the extra charges.

Division conflicts. Students who are in the wrong division for a given quarter will be purged from all preregistered courses for that quarter unless their division assignment is correct one month prior to the start of that quarter. Students must contact their college dean's office and/or Cooperative Education to correct their status.

Dropping courses. To drop a course, students must first obtain a course drop form at the registrar's or college dean's office. Not attending a class does not constitute withdrawal. Students must fill out the course drop form and have it signed by their instructor and by a representative of either their college dean or the department that offers the course. After obtaining all required signatures, students must return the original copy to the Office of the Registrar and keep a copy for themselves.

Course withdrawals are permitted through the third week of the quarter without any grade recorded on the permanent record. Course withdrawals at any time during the fourth through the eighth week of the quarter are indicated by a W on the record. After the eighth week, no withdrawals are accepted for any reason. At this point, a letter grade is posted on the record. A faculty member may choose not to sign a course withdrawal form if the student was involved in any kind of academic dishonesty in the class.

Change of name. Report all name changes to the Office of the Registrar immediately. This is especially important when students marry and wish to use a new name on University records.

Change of address. Notify the Registrar, Bursar, or Financial Aid promptly of any address change. Both the permanent home address and the local address are needed.

Transcripts. To obtain an official transcript, students (and alumni/ae) must send a check in the amount stipulated by the Office of the Bursar, mailing instructions, and a disclosure waiver, if necessary, to the assistant University registrar at 117 Hayden Hall. To request a transcript in person, first obtain an official receipt from the Office of the Cashier at 248 Richards Hall; then present the receipt and a valid photo ID at 117 Hayden Hall. Telephone requests are not accepted. Currently enrolled students can obtain unofficial transcripts in person from the student information kiosks located around campus. Students not currently enrolled can obtain an unofficial transcript in person only by presenting a valid photo ID at 117 Hayden Hall.

Withdrawal from the University. Students seeking to withdraw from the University for any reason should begin the process at the appropriate office for their academic level. Students should contact the office of the dean of their college. Students wishing to transfer should consult the dean's office for their school or the Office of the Dean of Students.

Students may be withdrawn from the University for financial, disciplinary, academic, or health reasons. In the last case, a committee will review the recommendations of the director of health services to determine whether the student should withdraw. The student has an opportunity to present his or her case to the committee. Withdrawals are made only when it is determined that the student is a danger to himself or herself or to other members of the University community, or when the student has demonstrated behavior detrimental to the educational mission of the University.

Procedures for student leave of absence for medical reasons. After the eighth week of the quarter students may withdraw from coursework (leave of absence) only for medical reasons. A student taking a leave of absence from academic work for medical reasons must contact the dean's office of his or her college. Medical reasons are considered to include both physical and emotional well-being. A representative of the dean's office will discuss the situation with the student and refer the student to the Lane Health Center with a petition form. The petition for a medical leave of absence must be made prior to the end of the quarter. The student's physician must provide appropriate medical information to the Lane Health Center physician. A student who is on co-op when he or she needs a medical leave of absence must contact the co-op coordinator.

A medical leave of absence may be effective for up to six months. During this period the student maintains all the rights and responsibilities of a Northeastern University student. If the student is covered under the Northeastern-sponsored Blue Cross/Blue Shield insurance, it remains in effect. After six months the student must obtain re-entry or be withdrawn from the University.

When the student is ready to return to the University, he or she must again contact the appropriate college representative, who in turn refers the student to the Lane Health Center. The center must be provided with medical documentation validating the treatment and the student's fitness to return to school. Strict confidentiality is maintained in all aspects of medical leaves of absence. Exceptions to these procedures are handled by the appropriate academic standing committee.

College Expenses

All students registered in a full-time day college are charged full tuition for coursework of twelve quarter hours or more. In addition, charges are made for coursework beyond the normal academic schedule. Students should note that the freshman year consists of three quarters of full-time study. The co-op program does not begin until sophomore year.

Full payment of tuition, residence hall fees, and other related charges are due prior to the start of each academic quarter. The payment due dates are as follows.

Fall Quarter

Freshmen	August 29
Upperclass	September 12

Winter Quarter

Freshmen and Upperclass	December 11
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Spring Quarter

Freshmen and Upperclass	March 11
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Summer Quarter

Freshmen and Upperclass	June 3
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The following are accepted methods of payment.

- Check or Money Order made payable to Northeastern University.
- Mastercard, Visa, or Discover. Payments may be made in person or by calling our 24-hour automated charge line, 617-373-2319 or 800-937-4067.
- Enrollment in one of our payment plans described below.

Students are responsible for the prompt payment of all bills. If a bill has not been received by the first week of the quarter, please go to the Bursar's Office where a bill will be created for you. Any discrepancies in your bill should be brought to the attention of the Bursar's Office. If there is a billing problem, pay the undisputed portion of the bill to avoid any additional late fees.

Three payment option. Northeastern University offers a three payment option plan. Information regarding this plan may be obtained at the Bursar's Office, 617-373-2270. There is a nominal fee for participation in this program. Applications along with the initial payment of one-third plus the fee are due by the due dates indicated above.

Extended payment option. You may opt to enroll in our extended payment option, which allows you to spread your tuition costs for an academic year, less Financial Aid, over 12 monthly payments. Contact the Bursar's Office at 617-373-2270 for additional information.

Overloads. Tuition charged on a per-quarter basis covers the cost of each student's required courses for that quarter. A student registered for 12–16 quarter hours for the quarter may register for an additional one quarter-hour course without added charge. Any courses beyond this will be billed to the student at the appropriate overload rate.

Transcripts and other academic records will not be released until all financial obligations to the University have been met.

The following chart estimates the annual costs for most students. Costs vary with the year and program of study. Tuition rates, room and board charges, and fees are subject to revision by the Board of Trustees at any time. In addition to the costs listed below, students should estimate costs for supplies, personal expenses, and transportation. If a student defaults on tuition and/or residence payments, he or she shall be liable not only for the outstanding balance, but also for reasonable collection costs and attorneys' fees incurred by the University in collecting unpaid balances.

1995–1996 Tuition

College/school/program	Freshmen (3 quarters)	Upperclass students (2 quarters)
Business	\$14,055	\$12,780
Computer Science	\$14,055	\$12,780
Engineering	\$14,055	\$12,780
Engineering Technology	\$14,055	\$12,780
Arts and Sciences	\$14,055	\$12,330
Criminal Justice	\$14,055	\$12,330

College/school/program	Freshmen	Upperclass students
	(3 quarters)	(2 quarters)
Journalism	\$14,055	\$12,330
Nursing	\$14,055	\$12,330
Pharmacy and Health Sciences	\$14,055	\$12,330
Alternative Freshman-Year	\$14,055	
Physical Therapy	\$14,055	\$12,780

The following fees are required of all students.

Application fee. This nonrefundable \$40 fee must accompany an application for admission.

Tuition deposit. A nonrefundable tuition deposit of \$200 applied to the first quarter tuition account is due by May 1 from all students entering in September. Students entering at other times of the year should note the required deposit date on their letter of acceptance.

Summer orientation fees. Summer orientation materials will be mailed to incoming students who pay their tuition deposit. The summer orientation is a mandatory program for all new and transfer students enrolled in classes for the fall quarter. A nonrefundable fee must accompany the student registration for summer orientation. This fee covers all orientation program materials, meals, and housing. The fee for new students is \$130; the fee for transfer students is \$105. Students can contact the Office of New Student Orientation and Commuter Services if they seek to make payment arrangements for their summer orientation fee due to financial considerations. Each parent and family member who will attend the parent/family summer orientation program must also include a non-refundable fee of \$105 with their registration.

Student services fee. Students pay a \$50 quarterly student center fee to support the Ell Student Center and a \$12 quarterly student activities fee to support student clubs.

Photo-identification card. This card is issued to new full-time students at orientation and registration. Students must have a properly validated card to use most University facilities. A replacement card costs \$5.

University health insurance. The University provides hospital insurance for all students who have matriculated, are carrying a course load of nine credits or more, or who are in a full-time program. This program is mandated by the Commonwealth of Massachusetts.

Students who are covered under a comparable hospital insurance plan may waive the University-offered insurance program by filing a waiver available at the Bursar's Office. Deadlines for waiving are applicable. A waiver form must be completed annually at the start of each academic year.

Sports pass fee. This \$45 fee (\$25 if student begins classes in winter quarter) allows students to attend all regular home games without additional charges.

Other fees may include the following.

Housing deposit. New students seeking on-campus housing must submit a nonrefundable \$400 deposit along with a completed housing application form to complete the housing application process. The upperclass housing deposit is \$75 per quarter.

Residential infirmary fee. All on-campus residents pay a quarterly \$25 fee for the use of the Lane Health Center Infirmary.

Residence hall activities fee. All students living in the residence hall system pay a quarterly \$15 fee for activities sponsored by the Residence Student Association.

Late fees. All accounts not paid in full by the indicated due dates will be subject to a late fee of \$200.

International student fee. A one-time fee of \$200 is charged to new undergraduate international students, payable after their acceptance at Northeastern University. The fee supports services available at the International Student Office.

Laboratory fees and deposits. Students taking laboratory courses should be prepared to purchase laboratory cards at the Cashier's Office, as directed by the department offering the course. Rates vary depending on the lab.

Liability insurance. Liability insurance must be carried by students as required by the academic program. This fee of \$18 is charged once per year.

Room and Board

At the beginning of the first quarter, all entering freshmen living in University residence halls will be billed for the nineteen meals per week option (\$1,190). Once on campus, freshmen may select either a ten or fifteen meal plan option.

Returning upperclass students must apply for housing each quarter.

Traditional Residence Halls

	Single	Double	Triple
Kerr Hall	\$1,540	\$1,340	
Light Hall	\$1,540	\$1,340	\$1,225
Melvin Hall	\$1,540	\$1,340	\$1,225
Smith Hall	\$1,540	\$1,340	\$1,225
Speare Hall	\$1,540	\$1,340	
Stetson West	\$1,540	\$1,340	
Stetson East	\$1,540	\$1,340	

Suites

Kennedy Hall	\$1,540	\$1,340	
153 Hemenway		\$1,340	\$1,225

Apartments

	Single	Double	5-Bedroom	6-Bedroom	8-Bedroom
Loftman Hall			\$1,500	\$1,465	\$1,390

	Single	Double	Triple	Quad
Burstein	\$1,830	\$1,460	\$1,235	\$1,225
Rubenstein	\$1,830	\$1,460	\$1,235	\$1,225
St. Stephens St.	\$1,885	\$1,485		\$1,250
407 Huntington	\$1,985			\$1,390
337 Huntington	\$1,885	\$1,485		
319 Huntington	\$1,885	\$1,485		
Willis Hall		\$1,775		\$1,490

The rates listed above are for standard room accommodations only. Rates can vary based upon adjusted capacities and room size or occupancy.

Freshman residence termination fee. Students who sign the license agreement are required to live on campus for the terms of the agreement. Students who fail to honor their agreement will be subject to a termination fee of 50% of subsequent quarters room charge.

Other residence rate adjustments. Students who terminate their license agreements before the third quarter, either voluntarily or involuntarily, will be assessed charges as outlined in the Residence Hall and Dining License Agreement.

Residence rate adjustments may be made provided specific conditions are met and a housing withdrawal form has been filed with Residence Life Office. Details regarding these conditions may be found in the Residence Hall and Dining License Agreement.

Freshmen and transfer students should refer to the Residence Hall and Dining License Agreement for specific rate adjustment information.

The standard adjustment rates for upperclass and upperclass graduate students are:

During the first week	75% credit
During the second week	50% credit
During the third week	25% credit
After the third week	no credit

University Dining Service

All students who live in traditional University residence halls and suites are required to participate in the food plan run by University Dining Service.

Meals per week	Cost per quarter
19	\$1,190
15	\$1,075
10	\$970
5	\$475 upperclass only

Husky plan. Students may deposit funds into a dining plan, which allows them to “drawdown” from the account to purchase food or other items available at specific locations throughout the campus. Contact University Food Services at 617-373-2481 for additional information.

University-Wide Programs

Honors Program

The University invites qualified students in each of its colleges to participate in a comprehensive honors program designed to foster high intellectual development and achievements. Based on criteria established by an individual college for its own majors, students are invited into the program as entering freshmen or as entering sophomores (based on Northeastern freshman-year grades). Other students may be recommended or express interest on their own at later points in their undergraduate careers.

Special limited-enrollment sections of many first- and second-year courses are offered for honors students. Honors seminars on interdisciplinary subjects are open to honors students. Junior/senior honors projects or courses are required of students in the program.

Honors and standard sections of courses are usually equivalent in terms of satisfying degree requirements and are distinguished by course number. For example, the honors section of ECN 1115 is ECN 1715; for PHL 1100 it is PHL 1700. An updated list of offerings is available in the honors program office and also appears in the registrar's course listings.

There are two other types of honors courses. *Honors within a standard course* are activity courses that allow students to substitute special work for some of the standard assignments within the course. *Honors outside a standard course* are adjunct courses that carry an additional one quarter-hour credit so that students receive two grades: one in the standard course and one in the honors adjunct. This one quarter-hour course may be taken only with another standard course and represents the enriched work that makes the entire five quarter-hour honors course. Activity and adjunct courses only appear on the listing in the honors program office. Because they do not carry separate numbers, activity and adjunct courses do not appear as honors-level in the registrar's course listings. Honors courses may be taken as a free overload. Criteria for free overloads are available in the honors program office.

The honors program also sponsors extracurricular cultural and recreational activities. Students may choose special honors housing in 115–119 Hemenway Street and/or use the honors lounge, study room, and computer room in 1 Nightingale Hall.

For more information on honors courses, on how to qualify to take courses, and on other aspects of the program, contact the honors program at 617-373-2333 or drop by 1 Nightingale Hall.

Honors Scholarships

Ambassador Awards. The University offers five half-tuition scholarships for exceptional academic achievement to non-U.S. citizens for the freshman year (September through June). The Ambassador Awards are given to freshmen enrolled in a full-time day academic program and are not renewable.

Carl S. Ell Presidential Scholarship. This scholarship program was established to recognize some of the University's finest incoming students and to foster the continuation of their superior academic performance.

Each year a limited number of freshmen who have records from high school that exhibit exceptional promise are selected for this academic achievement award. Criteria for selection include high school records indicating a college preparatory program, class rank, grade-point average, extracurricular activities, community service, letters of recommendation from guidance counselors, and SAT or ACT test scores.

The Ell Scholars effective with the Class of 1998 and beyond are awarded full tuition scholarships for their freshman year. Those who continue to maintain a superior scholastic average will have their scholarships renewed at the full tuition level in subsequent years. The Class of 1998 and beyond also receives full room and board. Awardees must reside on campus and maintain enrollment in the Honors Program.

Students in the classes of 1994–1997 who have maintained a superior scholastic average will also receive full tuition scholarships, but they do not receive the room, board, fees or international cooperative education internship stipend.

The application deadline is January 1. Carl S. Ell recipients must follow procedures to receive state and/or federal education grants to which they may be entitled.

New England Merit Scholarship. This scholarship was established to recognize some of the University's finest incoming students from the New England area and to foster the continuation of their superior academic performance. Each year a limited number of freshmen who have records from high school that exhibit exceptional promise are selected for this academic achievement award. Criteria for selection include high school records indicating a college preparatory program, class rank, grade-point average, extracurricular activities, community service, letters of recommendation from guidance counselors, SAT test scores, and semi-finalist standing in the national Merit Scholarship Program.

The New England Merit Scholarship recipients, effective with the Class of 1998 and beyond, are awarded full tuition scholarships and a \$2,000 grant for campus room and board. Those who continue to maintain a superior scholastic average will have their scholarships renewed in subsequent years.

The application deadline is January 1. New England Merit Scholarship recipients must follow procedures to receive state and/or federal education grants to which they may be entitled.

Dr. Ralph J. Bunche Scholars Program. Northeastern honors the late Dr. Ralph J. Bunche, Nobel laureate and former undersecretary of the United Nations, by awarding ten scholarships annually to African-American students who have outstanding records of academic achievement and leadership. These scholarships of full tuition, room, and board are renewable for students who maintain superior scholastic performance.

Compensatory Courses

Compensatory courses in English and mathematics are for freshman native speakers of English whose reading, writing, and/or mathematical skills need strengthening.

The University uses one or more of three criteria to determine which freshmen participate in the compensatory programs: pre-college academic credentials, tests administered during orientation week, or performance in ENG 1110, Freshman English 1.

In general, the program consists of five courses, each offering four hours of credit. The courses must fit into the following sequences.

Fall*

MTH 1000 Mathematical Preliminaries 1

ENG 1110 Freshman English 1†

or

ENG 1013 Fundamentals of English 1

Winter*

MTH 1010 Mathematical Preliminaries 2

ENG 1014 Fundamentals of English 2

Please note that successful completion of Mathematical Preliminaries 1 and 2 is a prerequisite for: MTH 1101, MTH 1106, MTH 1107, and MTH 1108

Nonbusiness mathematics sequence; and

MTH 1113 and MTH 1114

Business mathematics sequence

A passing letter grade in Freshman English 1 or Intensive Writing is a prerequisite for:

ENG 1111

Freshman English 2

ENG 1111-ENG 1113

Engineering sequence

ENG 1111

Engineering technology

*The same sequence is offered winter/spring for students who enter in January.

†Students whose work in this course is unacceptable for success in ENG 1111, Freshman English 2, will receive a grade of S and must complete ENG 1014, Fundamentals of English 2.

Schedule for Continuation of Compensatory Programming

Acceptance for credit is determined by the faculties of the individual colleges and is therefore subject to change. The chart below outlines policies on compensatory courses. Asterisked (*) courses are graded pass/fail and therefore are not included in the student's quality-point average. A yes designates acceptance for credit, a no designates non-acceptance, and an n/a, not applicable.

	English 1 (ENG 1110/1013)	English 2 (ENG 1014)	Mathematical Preliminaries 1* (MTH 1000)	Mathematical Preliminaries 2* (MTH 1010)
Arts and Sciences	yes	yes	yes	yes
Business Administration	yes	yes	yes	yes
Computer Science ¹	yes	yes	n/a	n/a
Criminal Justice	yes	yes	yes ²	yes ²
Engineering ¹	n/a	n/a	n/a	n/a
Engineering Technology	yes	yes	n/a	n/a
Nursing	yes	yes	no	no
Pharmacy and Health Sciences	yes ³	yes	no	no

¹This college offers MTH 1120 and MTH 1121, a course sequence in college calculus with algebra and trigonometry, to students who test deficient in mathematics. The sequence involves extra work in algebra and trigonometry and covers the same material as the regular freshman calculus sequences.

²Students whose diagnostic examinations suggest a need for basic mathematics may elect MTH 1000 or MTH 1010 to prepare for MTH 1106, Fundamentals of Mathematics.

³This college will accept ENG 1110 or ENG 1014 for credit only with a letter grade. Students who complete English courses must still take a four-credit English elective.

ROTC, Military Officers' Training Program

Army

The Department of Military Science offers the Reserve Officers' Training Corps (ROTC) program. The goal of ROTC is to develop men and women with leadership potential and prepare them for an officer's commission in the military service of the United States. The curriculum teaches principles of personnel management and seeks to develop leadership traits such as teamwork, ready acceptance of responsibility, the desire to achieve, self-confidence, and discipline.

The Army ROTC program is conducted at Northeastern. The Air Force and Navy ROTC programs are conducted at Boston University. For more information, write or call the Department of Military Science, 430 Parker Building, Northeastern University, Boston, MA 02115, 617-373-2372.

Marion M. Ferguson, Lt. Col., U.S. Army, MS, *Professor and Chair,*
Department of Military Science

Assistant Professors

Warren K. Dixon, Maj., MA
 Kerry M. Granfield, Capt., BA
 Dominic D. Swayne, Capt., BS

Completion of the program can lead to an officer's commission in the United States Army, Army National Guard, or United States Army Reserve.

The program consists of the basic course (freshman and sophomore years) and the advanced course (middler, junior, and senior years). It does not conflict with co-op schedules.

Enrollment in the basic course is voluntary and is open to all full-time students who are United States citizens. Students in the basic course do not incur a military obligation.

The advanced course is open to all qualified students who meet these prerequisites: completion of the basic course (or approved equivalent), or prior honorable military service; physical aptitude and medical requirements; and age requirements. Advanced course students receive a \$100-per-month stipend, up to \$1,000 per year. They are also paid for the six-week advanced camp they normally attend between their junior and senior years. Uniforms are issued to cadets without cost except for a refundable uniform deposit.

Full-time students meeting specific requirements may apply for scholarships covering their last four, three, or two academic years. These are merit-based scholarships, and a student's earnings during cooperative work periods do not reduce scholarship payments. The Army ROTC scholarship pays 80 percent of the student's tuition and provides an allowance for textbooks and laboratory fees, plus an additional living allowance of \$100 per month, up to \$1,000 for each year the scholarship is in effect.

Transfer students, whether or not previously enrolled in ROTC, are welcomed to join the program. They should contact the Department of Military Science concerning their options for program enrollment. Honorably discharged veterans (enlisted) are a vital part of our cadet corps and will receive special consideration for ROTC enrollment.

Air Force

Bernard C. Forcier, Lt. Col., U.S. Air Force, MBA, *Professor and Chair,*
Department of Aerospace Studies, Boston University

The Air Force Reserve Officers' Training Corps (AFROTC) program offers students an opportunity to earn a commission in the United States Air Force. The student is commissioned as a second lieutenant upon completion of both the aerospace studies (AS) curriculum and the requirements for an undergraduate or graduate degree. AFROTC classes and leadership laboratories are conducted on the Boston University campus. For more information, write the Department of Aerospace Studies, Boston University, 118 Bay State Road, Boston, MA 02215-1501, or call 617-353-4705.

The AFROTC program offers a four-year and a two-year program. Undergraduates may join the four-year AFROTC program by registering for the appropriate aerospace studies classes. Students from all academic disciplines, including five-year co-op, may register. Preferred entry is the first quarter of the first year, although students may enter as late as November of the sophomore year.

Academic coursework focuses on the functions and organizations of the Air Force, military history with an emphasis on the use of airpower, management techniques, and international relations and the impact policies have on the defense establishment. In addition, weekly leadership laboratories introduce students to Air Force customs and leadership skills. The Air Force uniform and AFROTC books are provided to the student free of charge except for a refundable uniform deposit.

Participation in AFROTC by nonscholarship students during the first two years of the four-year program carries no commitment to serve in the Air Force. The nonflying commissioned graduate incurs a four-year active duty service commitment. Navigators incur a six-year post-training commitment, and pilots incur an eight-year post-training commitment.

For entry into the two-year program students must have at least six remaining academic quarters of undergraduate or graduate study, meet Air Force physical standards, be of good moral character, and successfully complete a six-week field training encampment during the summer before the start

of the junior year. Prospective two-year program members should contact the University AFROTC detachment no later than December of the sophomore year.

Two scholarship programs are available. High school seniors may apply for the College Scholarship Program before December 1 of their senior year through their academic advisers or a local Air Force recruiter. The Scholarship Actions Program is available to college freshmen and sophomore students. Students who attend AFROTC classes in the fall quarter of their freshman year are eligible for two- or three-year scholarships; others are eligible for two-year scholarships.

Navy

Michael L. McHugh, Capt., U.S. Navy, MS, *Professor and Chair,*
Department of Naval Science, Boston University

The Naval Reserve Officers' Training Corps (NROTC) Nurse program provides an opportunity for a commission as a naval officer in the Nurse Corps. Nursing students at Northeastern may enroll in the NROTC Nurse program with the Department of Naval Science at Boston University.

Anyone wishing to contact NROTC should write to or call the office of the Commanding Officer, NROTC Unit, Boston University, 116 Bay State Road, Boston, MA 02215-1796, 617-353-4232/2535.

NROTC has two basic programs: the scholarship program and the college program. The scholarship program provides full tuition, uniforms, books and fees, and a \$150 per month stipend for four or two years of instruction at Northeastern University. These scholarships are granted as a result of annual nationwide competition. The college program provides students with naval science texts, uniforms, and a \$150 per month stipend during the last two academic years. Scholarships may be awarded to selected applicants who have been active in the college program for at least one semester. Applications for the college program are made through the Department of Naval Science at Boston University.

A two-year program is available for sophomores or middlers who do not join NROTC by the start of their sophomore year. Both scholarship and college program options are available; selection for this program takes place in the spring, and all applications must be submitted by late February of the sophomore year.

To be eligible for the Naval ROTC program, students must meet citizenship, age, and physical fitness requirements and be enrolled in a program leading to a nursing baccalaureate degree.

The NROTC program requires completion of both the academic major, including three quarters of English composition, and the naval science curriculum; participation in leadership laboratories (two hours a week during the school year); and indoctrination tours conducted at Navy/Marine Corps facilities.

The NROTC Nurse program also requires some professional training, depending on the program and the time of entry. This training occurs during summer "cruises" of four to six weeks each for scholarship students, and one "cruise" of four to six weeks for college program students.

Upon graduation and completion of NROTC requirements, scholarship students are obligated to serve on active duty for four years, college-program students for three years.

Academic Programs and Curriculum Guide

About Sample Curricula

Each department description includes a sample of the curriculum a student might follow to meet degree requirements. These sample curricula are for general information. Course requirements, elective course distribution, and achievement levels vary from program to program, and even class to class. Consult with your academic advising office, listed below, to make certain you have all the necessary resources before planning your own curriculum.

Alternative Freshman-Year Program	249 Ryder
College of Arts and Sciences	400 Meserve
African-American Studies	132 Nightingale
American Sign Language–	
English Interpreting	276 Holmes
Anthropology/Sociology	501 Holmes
Art and Architecture	239 Ryder
Biology	414 Mugar
Chemistry	102 Hurtig
Communication Studies	147 Meserve
Economics	301 Lake
Education	54 Lake
English	406 Holmes
Geology	14 Holmes
History	249 Meserve
Human Services	210 Lake
Journalism	102 Lake
Linguistics	565 Holmes
Mathematics	567 Lake
Modern Languages	360 Holmes
Music	351 Ryder
Philosophy and Religion	103 Meserve
Physics	111 Dana
Political Science	303 Meserve
Psychology	125 Nightingale
Theatre	337 Ryder
Bouvé College of Pharmacy and Health Sciences	206 Mugar
College of Business Administration	250 Dodge
College of Computer Science	161 Cullinane
College of Criminal Justice	400 Churchill
College of Engineering	220 Snell
College of Nursing	102 Robinson
School of Engineering Technology	120 Snell

Special note. In assessing quarter weights for courses, one quarter-hour of credit is equal to 50 minutes of instruction per week, plus two hours of preparation.

The Scheduling Office, 126 Hayden Hall, maintains all quarter-hour weights for courses. In the event of error in any publication, the academic record will reflect the correct quarter-hours applicable to any degree requirement.

Some course titles change, while the course number remains the same. Students must be sure not to register for a course they have already taken.

Middler-Year Writing Requirement

All middlers (that is, students who have earned 80+ quarter hours including non co-op students) must complete this graduation requirement at Northeastern. The requirement should preferably be completed before students accrue 144 quarter hours. Successful completion of Freshman English is a prerequisite to the MYWR. Students fulfill the Middler-Year Writing Requirement in one of two ways, depending on the requirements of their college: 1) complete a four quarter-hour MYWR course with a grade of C (2.0) or better; or 2) pass a one quarter-hour Writing Workshop (pass/fail). No transferred course from another university may satisfy this requirement.

This University requirement is designed to help students improve their writing for major courses and in their workplaces. The eight courses are therefore interdisciplinary so that students may write in subjects related to their major. For additional information, students may contact the English department, 406 Holmes Hall, 617-373-2512.

Intermediate Writing	ENG 1350
Writing for the Professions: Business Administration	ENG 1381
Writing for the Professions: Criminal Justice	ENG 1382
Technical Writing	ENG 1125
Writing Workshop specified for major	ENG 1340

Writing for the Professions: Health Services	ENG 1380
Advanced Writing	ENG 1352
Topics in Writing	ENG 1360
Technical Writing 2	ENG 1370

Colleges have specific guidelines and schedules for options that apply to majors. Students should consult their dean's office or adviser for guidelines. The following colleges recommend these MYWR courses.

College of Arts and Sciences	ENG 1350
Bouvé College of Pharmacy and Health Sciences (PAH)	ENG 1350 or ENG 1340
College of Business Administration	ENG 1381
College of Computer Science	ENG 1125
College of Criminal Justice	ENG 1382
College of Engineering (ENG'G)	ENG 1125 or ENG 1340
School of Engineering Technology (ENG'G)	ENG 1340
College of Nursing	ENG 1380

Undergraduate Degrees

College of Arts and Sciences

Majors

Concentrations

Minors

Bachelor of Arts

Bachelor of Science

African-American Studies

Cultural Studies

Historical Studies

Social/Behavioral Studies

African-American Studies

American Sign Language– English Interpreting¹

Anthropology

Anthropology

Applied Physics¹

Art

Architecture

Graphic Design

Art

Behavioral Neuroscience

Neuroscience

Biochemistry¹

Biology

Chemistry

Chemistry

Communication Studies

Speech and Rhetoric

Organizational

Communication

Radio and Television

Communication Studies

Economics

Economics

Education (Programs)

Early Childhood Education

Elementary Education

Secondary Education

English

English

Environmental Geology

Environmental Geology

Geology

Geology

History

History

Human Services

Human Services

Independent Studies

Journalism

Advertising

Newspaper/Print

Public Relations

Radio/Television News

Linguistics

Linguistics

Mathematics

Mathematics

Modern Languages

French

German

Italian

Russian

Spanish

French

German

Italian

Russian

Spanish

Music

Music Industry¹

Music Literature²

Music Literature and

Performance²

Music

Music Industry

Philosophy

Philosophy

Physics

Physics

Political Science

Law and Legal Issues

Public Administration

Political Science

Psychology

Psychology

Sociology

Sociology

Theatre

Theatre Generalist

Production

Performance

Theatre

Interdisciplinary Minors

Asian Studies

Cinema Studies

International Affairs

Jewish Studies

*Latino, Latin American,
and Caribbean Studies*

Linguistics

Marine Studies

Media Studies

Technical Communication

Urban Studies

Women's Studies

¹Bachelor of Science only

²Bachelor of Arts only

Bouvé College of Pharmacy and Health Sciences

Associate in Science
Bachelor of Science
Doctor of Pharmacy (6-year program)

Majors Concentrations Minors

Athletic Training
Cardiopulmonary Sciences
Cardiovascular Technology
Exercise Physiology
Respiratory Therapy

Cardiovascular Health and
Exercise

Medical Laboratory Science
Medical Laboratory Science

Additional Degrees

Associate in Science in Dental
Hygiene
Bachelor of Science in Dental
Hygiene

Bachelor of Science in Pharmacy
Bachelor of Science in Physical
Therapy
Bachelor of Science in Toxicology

College of Business Administration

Bachelor of Science in
International Business
Bachelor of Science in
Business Administration

Concentrations

Accounting
Entrepreneurship and New
Venture Management
Finance and Insurance

Human Resources
Management
International Business
Administration
Logistics and Transportation

Management
Management Information
Systems
Marketing

Minor

Business Administration

College of Computer Science

Bachelor of Science
Bachelor of Arts

College of Criminal Justice**Bachelor of Science**

Concentrations

Criminology and Corrections
Legal Studies
Policing and Security

College of Engineering**Bachelor of Science****Bachelor of Science in Chemical
Engineering****Bachelor of Science in Civil
Engineering****Bachelor of Science in Electrical
Engineering**

Concentrations

Electrical Engineering
Computer Engineering
Power Systems

Additional Degrees

**Bachelor of Science in Industrial
Engineering****Bachelor of Science in Mechanical
Engineering****Bachelor of Science/Master of
Science in Electrical Engineering****Bachelor of Science/Master
of Science in Industrial
Engineering****Bachelor of Science/Master of
Science in Mechanical Engineering**

College of Nursing**Bachelor of Science in Nursing**

**School of Engineering
Technology****Bachelor of Science in Engineering
Technology****Majors****Aerospace Maintenance
Engineering Technology****Computer Technology****Electrical Engineering
Technology****Mechanical Engineering
Technology****Minors***Computer Technology**Electrical Engineering
Technology**Mechanical Engineering
Technology*

College of Arts and Sciences

Robert P. Lowndes, PhD, *Dean*

Timothy Donovan, PhD, *Associate Dean, External Affairs*

Kay D. Onan, PhD, *Associate Dean, Faculty Affairs*

Malcolm D. Hill, PhD, *Associate Dean, Undergraduate Affairs*

Mary Mello, MA, *Director, Academic Administrative Services*

Charles J. Haberle, MS, *Assistant Director, Academic Administrative Services*

Gail F. Leclerc, MEd, *Academic Adviser*

Joseph O. B. Monahan, MA, *Coordinator, International Study Programs*

Lisa Nefussy, MS, *Coordinator, Undergraduate Student Services*

Jan Swindlehurst, MFA, *Coordinator, Undergraduate Student Services*

A broad study of disciplines in the arts and sciences is the core of higher education. Most students in the University—no matter what career training they choose—devote a substantial portion of their studies to the arts and sciences.

The college as a whole emphasizes general education through the college core curriculum. In addition, a large number of interdisciplinary and extradisciplinary programs are available. These include national and international exchange programs for study and experience; programs in field settings at sea and abroad; and programs involving affiliations in such areas as professional performing arts organizations, media organizations, and government offices.

In most programs, students may choose a four-year, full-time track or the five-year co-op plan. The five-year plan offers opportunities for paid employment, often in an area related to the student's chosen academic area. Students are normally eligible to participate in co-op when they become sophomores.

Students may enter the college with a specified major or with an unspecified liberal arts major preference (LAMP). Students in the LAMP program, however, must declare a major by the end of the freshman year. Considerable flexibility exists, and many students change majors during the first two years. The college offers a Bachelor of Arts degree and a Bachelor of Science degree in most programs. In general, the Bachelor of Arts degree requires more college core curriculum courses as well as a foreign language or American Sign Language. The Bachelor of Science degree requires fewer core curriculum courses but more work in the specific majors.

Many programs are flexible enough to allow students to pursue a double major. To do so, students must complete requirements for both majors.

The college also offers the option of an independent major for students whose interests and goals are not met by a specific major program. Interested students should consult an adviser in the dean's office after their sophomore year.

Class Entrance Requirements

In order to make normal progress, students in the College of Arts and Sciences are expected to maintain a minimum cumulative quality-point average of 2.0 and to earn 16 quarter hours of credit each quarter. For further details, refer to the *College of Arts and Sciences Guidebook* available from the dean's office, 400 Meserve Hall.

Graduation Requirements

Quantitative. Candidates for either the Bachelor of Arts (BA) or Bachelor of Science (BS) degree must successfully complete a minimum of 176 quarter hours. In addition, a combination of no more than 4 quarter hours of (1 or 2 credit) physical education activity courses or ROTC credits may be used to meet this requirement.

Residency. Candidates must complete either 75 percent of the degree credit (132 quarter hours) or the last three full quarters (a minimum of 12 four-credit courses) in the Northeastern University Basic Day Colleges.

Qualitative. Candidates must achieve a minimum cumulative average of 2.0 (grade of C).

Transfer credit. Transfer credit is granted initially for courses that fulfill major, college, or elective requirements in an arts and sciences program. Courses must be from an accredited college or university and credit will be granted only for courses in which the student earned a grade of at least C (2.0). Courses taken pass/fail are not eligible for transfer credit. To receive credit for courses in progress at the time of application, the student must submit an updated official transcript for review. Students should contact a major or dean's office adviser prior to enrollment to have transfer credits evaluated, both for major and college requirements. Students who believe that they should be granted additional transfer credit should consult with an academic adviser in the College of Arts and Sciences dean's office, 400 Meserve Hall.

Core curriculum. The College of Arts and Sciences core curriculum is required of all students. The core curriculum is a set of requirements intended to provide students with the opportunity to gain the broad base of knowledge traditionally associated with a liberal arts education. The core allows students to develop proficiency in basic skills; to be exposed to methods of inquiry in the various subjects and disciplines in the arts and humanities, the social sciences, and the natural sciences and mathematics; and to become acquainted with ideas in Western culture, differing views in non-Western cultures, and major issues and problems facing contemporary society.

The core curriculum consists of six categories:

Category I Basic Skills

- Freshman English (two or three courses)
- College mathematics
- Modern language or American Sign Language through Intermediate 2 level (required of all Bachelor of Arts candidates)

Category II Methods of Inquiry

Category III The Western Cultural Heritage

Category IV Alternative Cultures and Societies

Category V Theoretical Perspectives and Changes

Category VI Current Issues in Perspective

For placement information on freshman English, college mathematics, or modern languages, students should consult the appropriate department or the Office of the Dean, 400 Meserve Hall.

Descriptions for all College of Arts and Sciences courses begin on page 116. Courses approved for the college's core curriculum have Roman numerals in parentheses at the end of the descriptions to indicate the appropriate core curriculum categories for each core course. Students are required to complete courses in each category of the core, depending on the major and degree pursued. The *College of Arts and Sciences Guidebook*, available in the Office of the Dean, 400 Meserve Hall, provides a list of courses that may be used to fulfill each category requirement.

Foreign language. All Bachelor of Arts degree candidates must show proficiency in a modern foreign language or American Sign Language by earning a passing grade in Intermediate 2 level of a college course or by meeting a comparable criterion approved by the Department of Modern Languages.

Conditional exemption from this requirement may be granted to students who earned an average of C or better in a full, four-year language sequence in secondary school. A conditional exemption must be confirmed by taking a proficiency examination during the first quarter at the University. A sufficiently high score will verify the exemption; otherwise, the student will be advised of the appropriate language course to take in the following quarter.

Absolute exemption is granted to students for whom English is a foreign language or who receive a score of 550 or better in the Language Achievement Examinations.

The normal sequence for students with no prior preparation is two quarters of elementary-level language and two quarters of intermediate-level language. The Department of Modern Languages will determine an appropriate entry point at which students who have partial language preparation may begin completing the requirement. Students who plan to use German, Russian or Italian to fulfill the foreign language requirement should begin study as early as possible; the college is not able to offer these courses on a regular basis.

Middler-year writing requirement. The middler-year writing requirement (MYWR) may not be fulfilled until the student has successfully completed at least 80 quarter hours (including transfer credit) and should preferably be completed before 144 quarter hours. The requirement must be fulfilled at Northeastern. The College of Arts and Sciences strongly recommends intermediate writing (ENG 1350) to complete the MYWR. Students may, however, also satisfy the requirement by completing a four-credit writing course from the approved MYWR list (found in the *College of Arts and Sciences Guidebook*) with a grade of C or better or, with special permission, a one-credit writing workshop (ENG 1340). Students not participating in the cooperative education program should complete the MYWR in their junior year.

Interdisciplinary Minors

Minor in Asian Studies Curriculum

Students may choose a concentration in Middle Eastern studies or East Asian studies (China, Japan, Korea). Courses cover a range of academic disciplines including anthropology, history, music, philosophy and religion, sociology, language, and political science. In each concentration, three core courses and four electives are required.

Concentration in Middle Eastern studies. HST 1612, The Modern Middle East; PHL 1280, Islam; and POL 1345, Government and Politics in the Middle East. Choose four electives: ECN 1332, Economic History of Less Developed Countries; HST 1613, Contemporary Middle East; HST 1614,

The Middle East Today in Fact, Fiction, and Film; HST 1652, Islam Resurgent; MUS 1182, Music of the Middle East; and POL 1384, Arab-Israeli Conflict.

Concentration in East Asian studies. HST 1637, Modern Japan; PHL 1275, Eastern Religions; and POL 1371, Government and Politics of China. Choose four electives: HST 1150, Introduction to Third World History; HST 1633, Modern China; HST 1634, Contemporary China; POL 1332, Government and Politics of Japan; HST 1641, Recent Leaders of Asia; PHL 1130, Ethics: East and West; PHL 1255, Indian Philosophy; PHL 1250, Chinese Philosophy; PHL 1293, Mysticism: East and West; POL 1372, China's Foreign Relations; and SOC 1104, Contemporary Japanese Culture and Society.

For both concentrations, it is strongly recommended that students gain proficiency in an Asian language. Chinese courses are currently taught in the program.

Minor in Cinema Studies

The minor in cinema studies helps students acquire skill in analyzing one of the major art forms and cultural influences of the twentieth century. It also provides critical tools that can be used to study the relationships between film and society, history, aesthetics, performance, philosophy, and psychoanalysis. Students take eight courses: two required courses, a video production requirement, and five electives. The interdisciplinary curriculum draws from courses in several departments.

Required courses. LNF 1550, Introductory Film Analysis; LNF 1551, Film Theory; and one of the following: ART 1171, Animation Workshop; ART 1180, Video Basics; or CMN 1450, Television Studio Production. **Choose five electives:** ART 1233, Contemporary Directions in Cinema; ART 1235, History of Film; ART 1236, The American Film; ART 1238, Documentary Film; ART 1281, Video Project; CMN 1454, Programming for Radio and Television; CMN 1455, Television Field Production; CMN 1554, Special Topics in Media (when appropriate); ENG 1288, Film and Text; ENG 1289, Shakespeare on Film; ENG 1290, Topics in Film (may not be counted more than twice); ENG 1291, Popular Culture; ENG 1294, Modern Film; ENG 1295, American Film and Society; ENG 1297, Approaches to Film; HST 1494, History and Film; HST 1575, History of Media in America; HST 1591, American Images of China; INT 1320, Exploring the Humanities through Film; INT 1321, Modernism; LNF 1521, French Film and Culture; LNF 1560, Film and Psychoanalysis; LNG 1554, Modern German Film and Literature; LNS 1550, Spanish Civil War in Spanish Film; MUS 1139, Film Music; SOA 1120, Camera on Culture: Visual Anthropology; THE 1316, Acting for the Camera; THE 1849, Special Topics.

For more information, contact the director of cinema studies, Professor Inez Hedges (1 Boston YMCA), at 617-373-5163.

Minor in International Affairs

The minor in International Affairs provides students with the opportunity to develop a greater awareness and understanding of both regional and global issues. It seeks to better prepare students for the interdependent world in which they will live, work, compete, and cooperate upon graduation.

*Students take seven courses, plus fulfill an International Experience.

*INT 1105, Introduction to International Affairs; *INT 1870, Senior Seminar in International Affairs; five electives chosen from categories of *Regional Analysis* and *Global Dynamic and Development* and to be distributed as described (see below). *International Experience, fulfilled by choosing one from among four options: (a) study abroad, through enrollment in one of the Northeastern University study abroad programs, or, with prior approval, through another university; a minimum of one term is required, with two terms encouraged; a maximum of two courses taken as part of study abroad may be counted in fulfilling the number of electives, and these courses must fall within the proper elective categories; (b) internship abroad, which the student may develop or which may be sponsored by a major department or CAS International Study Programs Office; the internship may carry academic credit (with departmental approval); (c) international coop, arranged through the Division of Cooperative Education; or (d) directed study on campus (when the foregoing are not feasible), to be supervised by faculty specialized in a specific country or region of the student's interest; a minimum of 8 credits is required.

Elective categories. A total of five elective courses is required from the dual categories of *Regional Analysis* and *Global Dynamics and Development*, as listed below. Students must take at least two courses from each category.

Regional analysis. Students must select two or three courses from this category and these courses must be chosen from at least two different regional subcategories.

(A) Africa: AFR 1197, Modern African Civilization†; AFR 1156/MUS 1181, Music of Africa; AFR 1191*/HST 1620,* Early African Civilization; AFR 1193, Africa Today; AFR 1195, Identity and Nationalism in Africa; AFR 1197*/HST 1621,* Modern African Civilization; AFR 1342*/POL 1342,* Crisis and Conflict in Black Africa; AFR 1403*/HST 1623, History of West Africa; and AFR 1405*/HST 1625,* South African History.

*Note: Though not required in the minor, students are strongly encouraged to achieve competency in a foreign language and are also advised to undertake foreign language study while abroad during fulfillment of their International Experience as appropriate.

†This course is expected to be offered annually.

(B) Asia: HST 1581, American Images of China; HST 1610, Topics in Asian History†; HST 1633, Modern China†; HST 1634, Contemporary China; HST 1637, Modern Japan†; MUS 1183, Music of East Asia†; PHL 1250, Chinese Philosophy; PHL 1255, Indian Philosophy; PHL 1275, Eastern Religions†; PHL 1293, Eastern and Nontraditional Philosophy; POL 1332, Government and Politics of Japan†; POL 1371, Government and Politics of China†; SOC 1104, Sociology of Japan†;

(C) Europe: ART 1204, Renaissance Architecture†; ART 1205, Renaissance Art†; ECN 1333, European Economic Development; ENG 1652, Twentieth Century English Literature; HST 1301, Topics in European History; HST 1390, Population in European History; HST 1473, Women in Modern Europe†; HST 1481, The Culture of Europe; INT 1321, Modernism; LNF 1521, French Film and Society†; LNG 1554, Modern German Film and Literature†; LNS 1550, Spanish Civil War in Spanish Film†; POL 1306, Politics in Western Europe†; POL 1340, Crisis and Change in Central/Eastern Europe†; POL 1343, Politics and Violence in Northern Ireland†; POL 1347, Russian Politics After Communism†; SOC 1105, Society and Culture in Russia and the Former Soviet Union†;

(D) Latin America: AFR 1196, The Black Experience in the Caribbean; HST 1604, Modern Latin America†; HST 1605, The Modern Caribbean†; INT 1121, Introduction to Latino, Latin American, and Caribbean Studies; LNS 1501, Backgrounds of Latin American Culture†; LNS 1511, Introduction to Caribbean Literature†; MUS 1184, Music of South America, Latin America, and the Caribbean†; POL 1368, Government and Politics of Latin America†; SOA 1430, Latin American Society and Development;

(E) Middle East: HST 1612, The Modern Middle East†; HST 1613, The Contemporary Middle East; HST 1614, The Middle East Today in Fact, Fiction, and Film; MUS 1182, Music of the Middle East; PHL 1285, Introduction to Jewish Religion and Culture; POL 1345, Government and Politics in the Middle East†; POL 1346, Gender in the Middle East†.

Global dynamics and development. Students must choose at least two courses from this category:

AFR 1294, Third World Political Relations; ECN 1150, Economics of World Energy and Primary Resources; ECN 1330, Development Economics†; ECN 1335, International Economics: Finance†; ECN 1336, International Economics: Trade†; HST 1644, Third World Women; HST 1652, Islam Resurgent; INB 1338, Introduction to International Business†; INB 1731, Cultural Aspects of International Business†; INB 1735, Import and Export Management†; PHL 1130, Ethics East and West†; PHL 1137, Philosophical Problems of War and Peace; PHL 1280, Islam†; POL 1112, Introduction to International Relations†; POL 1113, Introduction to Foreign Governments†; POL 1309, International Political Economy†; POL 1313, International Organization†; POL 1337, U.S. Foreign Policy†; POL 1338, Religion and Politics; POL 1369, Political Violence; POL 1384, Arab-Israeli Conflict†; POL 1386, International Law; POL 1411, Seminar in International Relations; SOA 1104, Cultures of the World†; SOA 1120, Camera on Culture; SOA 1310, Global Markets and Local Cultures; SOA 1430, Latin American Society and Development†; SOC 1171, Race and Ethnic Relations: A World Perspective.

Minor in Jewish Studies

The minor in Jewish studies provides students the opportunity to undertake the study of Jewish religion, culture, and history at Northeastern or in combination with courses at Hebrew College in Brookline, Massachusetts, and courses under the study abroad program. Students take seven courses. A minimum of four courses must be taken at Northeastern.

All students must take PHL 1285, Introduction to Jewish Religion and Culture, and a senior-level directed study or seminar that involves a major research project.

Additional courses at Northeastern. HST 1539, American Jewish History; POL 1384, The Arab-Israeli Conflict; PHL 1315, Understanding the Bible; ENG 1558, Jewish Themes in Literature (Literature in Context); MUS 1185, Music of the Jewish People; SOC 1350, Jewish Women in U.S. Culture; PHL 1110, Introduction to Religion* or SOC 1470, Sociology of Religion*; SOC 1140, The Sociology of Prejudice.*

Students may petition the Jewish studies coordinator to gain Jewish studies credit for any courses not on this list for which they do substantial work in Jewish studies.

Courses at Hebrew College. Students take courses approved by the coordinator of Jewish studies at Northeastern. Students should contact the University registrar, Dean Edmund Mullen, for more information about enrolling at Hebrew College.

Study abroad. Students take courses at Hebrew University, Tel Aviv University, or Ben Gurion University under the study abroad program. Courses must be approved by the coordinator of Jewish studies at Northeastern.

For more information contact the Jewish studies coordinator, Professor Joshua Jacobson, at 617-373-2440.

*Students wishing to take these courses must complete a research project directly related to Jewish studies.

†This course is expected to be offered annually.

Minor in Latino, Latin American, and Caribbean Studies

This minor offers students an interdisciplinary curriculum drawn from seven academic departments. The Latin American and Caribbean studies emphasis combines historical, social-scientific, ecological, and cultural-aesthetic approaches to the study of Latin American society. Latino studies explores the large, long-standing, and growing Latin American presence in communities outside Latin America, especially in North America. The minor helps students prepare for more specialized work in fields such as business, social services, diplomacy, health, law, education, and international relations with Latin American and Latino populations both in the United States and abroad.

The minor includes a strong link to the co-op program, to community-based internships, and to study abroad programs. It is strongly recommended that students pursuing the minor achieve proficiency in Spanish. Students take six required courses and either complete an internship or co-op experience in a community-based agency or participate in a study abroad program. All students must take INT 1121, Introduction to Latino, Latin American and Caribbean Studies; one course in history; one course in language, literature, and music; one course in social science; and two comparative courses that include Latin American, Caribbean, or U.S. Latino populations. Students should consult with the academic adviser for the minor to make final determination of courses included.

History: AFR/HST 1196, The Black Experience in the Caribbean; HST 1538, Latinos in the U.S.; HST 1604, Modern Latin America; HST 1605, The Modern Caribbean; HST ____, U.S. History from a Latino Perspective.

Humanities, language, and literature: LNS 1315, Latin American Literature (Colonial, 19th Century); LNS 1316, Latin American Literature (20th Century); LNS 1500, Backgrounds in Hispanic Culture; LNS 1501, Backgrounds in Latin American Culture; LNS 1511, Introduction to Caribbean Literature; MUS 1184, Music of Latin America and the Caribbean; and new courses added in this area.

Social science: POL 1368, Government and Politics of Latin America; SOA 1430, Latin American Society and Development; SOC 1460, Sociology of Latino Society; and new courses added in this area.

Comparative Studies (courses that include components of Latino, Latin American and Caribbean societies and compare them to other societies): AFR 1151, African-American Art History; AFR 1155, Foundations of Black Culture; AFR 1294, Third World Political Relations; POL 1316, Contemporary Revolutionary Politics; POL 1386, International Law; SOA 1100, Peoples and Cultures; SOA 1104, Cultures of the World; SOA 1146, Rural Workers in the Third World; SOC 1146, Environment and Society; SOC 1170, Race and Ethnic Relations; SOC 1171, Race and Ethnic Relations: A World Perspective; SOC 1255, Sport in Society; SOC 1455, Sport and Culture; THE 1847, Images of Afro-American and Latina Women in Film; and new courses added in this area.

Minor in Linguistics Curriculum

Seven departments (African-American Studies, American Sign Language, English, Modern Languages, Philosophy and Religion, Psychology, Sociology/Anthropology) collaborate to offer the Minor in Linguistics. Courses are cross-listed and can be taken under either prefix.

LIN 1118, Introduction to Language and Linguistics 1; LIN 1218, Introduction to Language and Linguistics 2; one of the following: LIN 1220, Introduction to Phonetics and Phonology; LIN 1262, Psychology of Language; LIN 1401, Introduction to Syntax.

Three courses, not already taken, from the following: LIN 1119, History of the English Language; LIN 1215, Symbolic Logic; LIN 1220, Introduction to Phonetics and Phonology; LIN 1231, African-American English; LIN 1235, Applied Linguistics; LIN 1236, Advanced Applied Linguistics; LIN 1240, Bilingualism; LIN 1245, History of the French Language; LIN 1250, Linguistics of American Sign Language; LIN 1255, History of the Spanish Language; LIN 1260, Introduction to Romance Linguistics; LIN 1262, Psychology of Language; LIN 1263, Nonverbal Communication; LIN 1335, Language and Culture; LIN 1362, Child Language; LIN 1364, Cognition; LIN 1365, Language and the Brain; LIN 1401, Introduction to Syntax; LIN 1402, Grammars of English; LIN 1407, Semantics; LIN 1408, Topics in Linguistics; LIN 1415, African Languages; LIN 1440, Philosophy of Language; LIN 1562, Laboratory in Psycholinguistics; LIN 1564, Laboratory in Cognition; LIN 1661, Seminar in Psycholinguistics; LIN 1662, Seminar in Cognition; LIN 1692, Seminar in Linguistics; LIN 1693, Seminar in Linguistics; and LIN 1804, Directed Study.

For more information, contact Professor Janet Randall, linguistics program coordinator, at 565 Holmes Hall, 617-373-3678.

Minor in Marine Studies Curriculum

The marine studies minor allows students from all majors to explore the marine environment. Students may focus on either the scientific or social science/humanistic approach to studying the ocean. The program is designed to develop specific marine-related skills and requires completion of an independent study. Students are encouraged to participate in marine field courses such as Northeastern's East-West Program, which focuses on biological research, or the SeaSemester Program, which includes sail-training on a tall ship.

For more information contact Professor Peter Rosen, marine studies coordinator, 617-373-3176.

Minor in Media Studies Curriculum

To qualify for a minor in media studies, the student must complete a minimum of eight courses: CMN 1250, Introduction to Mass Communication; HST 1575, History of Media in America; and CMN 1300, Communication Theory *or* CMN 1317, The Audience in Mass Communication *or* INT 1320, Exploring Humanities through Film; and five elective courses from the two categories media production and media application (at least two electives in each category). Individual student programs may be developed. Students should contact Professor Alan Zaremba (Department of Communication Studies) for information on program development and elective choices.

Minor in Technical Communication Curriculum

Technical communication combines written, oral, and graphics skills with a background in science or technology. The minor in technical communication prepares students for careers as technical writers, or for careers in which technical communication is a significant part of the job. Students in English or other liberal arts studies may elect the minor, as may students from a variety of technological or scientific fields. A student does not have to be enrolled in the College of Arts and Sciences to declare the minor.

Eight courses are required: ENG 1125, Technical Writing; ENG 1370, Technical Writing 2 *or* ENG 1371, Writing for the Computer Industry; ENG 1352, Advanced Writing *or* ENG 1380, Writing for the Professions: Health Services *or* ENG 1381, Writing for the Professions: Business Administration; CMN 1116, Public Speaking *or* CMN 1331, Advanced Interpersonal Communication; JRN 1440, Design and Graphics (or an equivalent in another department or college); COM 1101 Algorithms and Data Structures 1; and two of the following, preferably both within the same discipline: BIO 1106, General Biology; BIO 1107, Animal Biology; CHM 1111, General Chemistry 1; CHM 1112, General Chemistry 2; GE 1106, Programming Computers; GEO 1212, Physical Geology; GEO 1222, Historical Geology; IIS 1125, COBOL Programming 1; PHY 1221, Physics for Science and Engineering Students 1; PHY 1222, Physics for Science and Engineering Students 2; PHY 1223, Physics for Science and Engineering Students 3.

Minor in Urban Studies Curriculum

Students must take seven courses. SOC 1147, Cities and Society; POL 1324, Urban Politics; ECN 1320, Urban Economics; and one course from each of the following areas:

Urban problems and policies: SOC 1346, Suburb and Metropolis; POL 1308, Politics of Poverty; POL 1318, State and Local Government; ECN 1321, Urban Economic Problems and Policies.

Urban humanities: HST 1391, European Urban History to 1850; HST 1543, American Urban History; ENG 1608, The City in Literature.

Urban form and design: ART 1111, Introduction to Architecture; ART 1226, Modern Architecture 2; ART 1150, Architectural Design 1.

African-American studies: AFR 1261, Economics of Urban Poverty; AFR 1275, Urban Political Issues; AFR 1475, Public Policy Analysis.

To obtain credit for the minor, students must file a petition form with the College of Arts and Sciences. Interested students should confer with an adviser as soon as possible. Advisers are Professor John Portz, political science, 303 Meserve Hall, 617-373-2796; Professor Peter Serenyi, art and architecture, 239 Ryder Hall, 617-373-2347; Professor Gregory Wassall, economics, 317 Lake Hall, 617-373-2196.

Minor in Women's Studies Curriculum

The Women's Studies program offers students an opportunity to work with respected scholars in a variety of disciplines to examine the human experience through the perspectives of women. This interdisciplinary program examines the importance of gender in societies around the world, past and present. The curriculum encourages students to learn and think about how changing beliefs about women and men have affected research and scholarship in the arts, humanities, and social and natural sciences. Students learn about gender stereotypes, the various ways ideas about gender and sexuality gender roles have developed, and the changing situation for women and men today. Key questions are posed that change how people see the world: How does gender influence the kinds of questions we can ask of the world around us? What information can become data when you use gender as a central part of examining a problem? The Women's Studies program coordinates the Boston Area Colloquium on Feminist Theory lecture series, sponsors talks by scholars on campus, produces the Working Papers in Gender Studies Series, and sponsors the Visiting Research Scholars in Women's Studies series. Women's Studies also works closely with the independent, student-run Women's Center to sponsor programs for Women's History Month and other events of special concern to women students.

To minor in Women's Studies, students take a total of seven courses: SOC 1150 *or* INT 1150, Introduction to Women's Studies; SOC 1302 *or* INT 1302, Feminist Perspectives on Society; and five electives.

Undergraduate elective courses. AFR 1241, Black Family; AFR 1121, African American Literature 1; AFR 1133, History of Blacks in Media Press; AFR 1251, Survey of Black Drama; AFR 1442, African American Women; CJ 1616, Women and the Criminal Justice System; CMN 1232,

Gender and Communication; ECN 1312, Women in the Labor Market; ENG 1551, Gender Roles in Literature; ENG 1600, Topics in Literature (when gender related); ENG 1602, Major Figure (when gender related); ENG 1678, Early African American Literature; HST 1472, The Family in European History; HST 1473, Women in Modern Europe; HST 1554, Women in America; HST 1644, Third World Women; LNF 1560, Film and Psychoanalysis; LNS 1306, Spanish Golden Age Theatre; LNS 1500, Backgrounds of Spanish Culture; LNS 1510, Saints and Sinners; MUS 1106, Women in Music; MUS 1800, Directed Study (when gender related); NUR 1303, Life Crisis: Analysis and Response; NUR 1606, Women's Health Choices; PHL 1295, Medicine, Religion, and the Healer's Art; POL 1327, Sex Roles in American Politics; POL 1328, Women in Public Management; POL 1346, Gender and Politics in the Middle East; PSY 1218, Psychology of Women; SOA 1100, Peoples and Cultures; SOA 1146, Rural Workers in the Third World; SOA 1160, Sex, Sex Roles, and the Family; SOA 1301, Human Origins; SOA 1303, Sexuality and Culture; SOA 1430, Latin American Society and Development; SOC 1155, Sociology of the Family; SOC 1160, Sex-Gender Roles in a Changing Society; SOC 1177, Social Roles in the Business World; SOC 1178, Women Working; SOC 1217, Women, Health, and Social Change; and SOC 1350, Jewish Women in U.S. Culture. New courses are being developed.

Undergraduate students who want to integrate their interest in women's studies with a major discipline can consult with the Women's Studies coordinator to develop an interdisciplinary major, the arts and sciences college "independent major."

Graduate students interested in women's studies should note that, pending approval, a non-degree Graduate Certificate in Women's Studies may be available soon. Currently, graduate students in the sociology and anthropology department can develop a specialization in gender. A range of departments and colleges offer graduate courses in gender.

Graduate elective courses. CJ 3515, Gender and Justice: Women, Crime, and the Law; CRS 3356, Seminar in Feminist Theory; CRS 3384, Human Sexuality; ENG 3315, Contemporary Critical Theory; ENG 3317, Topics in Criticism: Feminist Literary Theory; ENG 3333, Major Figures in African American Literature; Topics in Literature courses accepted when focused on women; ENG 3403, Topics in Linguistics: Language, Gender, and Power; HST 3361, European Women's History; HST 3370, Seminar in History of the Family; HST 3398, Seminar in Feminist Theory and Historical Inquiry; HST 3399, Seminar in Approaches to Women's History; POL 3665, Women in Public Management; POL 3667, Equal Opportunity in Public Administration; SOA 3102, Class and State Formation; SOA 3103, Gender, Sexuality, and Culture; SOA 3156, Gender, Kinship, and Social Change; SOC 3155, The Family; SOC 3160, Women, Men, and Social Change; SOC 3175, Sociology of Work; SOC 3302, Feminist Methodologies; SOC 3304, Feminist Theory; SOC 3319, Contemporary Religious Identity: A Feminist Focus; SOC 3365, Social Movements; SOC 3412, Contemporary Issues in Sociology when gender oriented; and NUR 1606, Women's Health: Choices and Decision. New courses are being developed and added.

These are only some of the courses offered. New courses are continually being developed and added to the program. For more information and the most recent brochure describing the Women's Studies Program, contact Professor Christine Gailey at 617-373-4991 or Ms. Audrey Aduama at 617-373-4984.

Special Programs

Additional information is available from involved departments and the Office of the Dean, 400 Meserve Hall.

The availability of all special programs is contingent on meeting minimum enrollment numbers and, when an outside institution is involved, continued affiliation of that institution with the University. Overseas study programs are open to qualified middlers, juniors, and seniors with a cumulative quality-point average of 3.0 or higher.

Independent Major

An eligible student may petition the College Curriculum Committee to meet requirements for a degree in an independent major. Eligibility, procedures, and requirements must be discussed in advance with an adviser in the Office of the Dean. No student may be considered for an independent major until a curriculum proposal has been submitted to, and approved by, the College Curriculum Committee.

Combined Program with Professional Schools

In the combined program, a preprofessional student may reduce by one year the time normally required for obtaining both the undergraduate and professional degrees. Students who have completed at least three-fourths of the work required for a baccalaureate degree in the College of Arts and Sciences and who are accepted into an approved professional school of dentistry, law, medicine, optometry, osteopathy, or veterinary medicine will be eligible for the Bachelor of Arts or Bachelor of Science degree at the end of their second year in a professional school. At least two-thirds of the work for the baccalaureate degree must be earned in residence at Northeastern, and all other College of Arts and Sciences requirements must be fulfilled. The residence requirement must be completed prior to entering the professional school.

**Bachelor of Arts or
Bachelor of Science/
Juris Doctor Degree
Program**

**Bachelor of Arts or
Bachelor of Science/
Master of Business
Administration Program**

**Northeastern
University-Hebrew
College Exchange
International Programs**

Northeastern offers an eight-year joint degree program for aspiring lawyers. Each year a limited number of highly qualified freshmen are admitted to the five-year undergraduate portion of the program.

To continue into the law school portion of the program, students must graduate in the top 15 percent of their class and score in the top 20 percent of the Law School Aptitude Test (LSAT). Students who meet these criteria will be qualified to continue their studies at Northeastern University School of Law.

A limited number of students may combine an initial period of undergraduate study in the College of Arts and Sciences with graduate study in the College of Business Administration, enabling students to earn both the Bachelor of Arts or Bachelor of Science and the Master of Business Administration degrees including one year of co-op work experience (six months undergraduate and six months graduate) in a five- or six-year period.

In the first three years, students complete nine academic quarters of arts and sciences courses with two quarters of cooperative education. After taking the GMAT and being accepted into the College of Business Administration in the third year, students spend their fourth year completing requirements in their undergraduate major and beginning graduate coursework in the Cooperative Education MBA Program. Depending on the undergraduate major, twelve credits of undergraduate study may be applied toward the MBA or twelve credits of MBA study may be applied toward the bachelor's degree. Students may begin the Cooperative education MBA portion of study in January or June.

Interested students should contact the College of Arts and Sciences dean's office in 400 Meserve Hall or the College of Business Administration's graduate school in 350 Dodge Hall.

This program offers students the opportunity to register for courses in specialized areas of Jewish studies and Jewish education. See page 33, Minor in Jewish Studies, or contact the University registrar, Dean Edmund Mullen, 120 Hayden Hall, 617-373-2183, for more information.

Egypt and Israel. A full-year program. Students spend the autumn at the American University in Cairo and the winter-spring period at Tel Aviv University. During the break between semesters internships in Israel will be arranged. A wide variety of arts and sciences courses are available. Classes are in English, with courses in Arabic and Hebrew available. Earns 48 quarter hour credits.

European Studies. This winter quarter program is based at the University of Louvain, Belgium, just outside Brussels. Courses (taught in English) are available on various facets of the history and culture of the European Community. Students also participate in a research internship in collaboration with the office of a Member of the European Parliament. (Students have the option of spending the preceding fall quarter in the programs in Dublin or London.)

University of Ghana. Courses in English offer all students an opportunity to learn first hand about the history and culture of West African life, through an extensive array of courses. Recommended for fall quarter.

Ireland: North and South. Students in this program spend two quarters in Ireland: fall at the Institute of Public Administration in Dublin and winter at Queen's University in Belfast. The general focus is on social sciences and humanities. Courses are available in literature, sociology, political science, history, etc. An exciting feature of the fall quarter is an internship in the Irish parliament.

London Parliamentary and Public Policy Internships. During the fall or winter quarters, students may work as assistants to Members of the House of Commons and the House of Lords, or with British political parties, public and social policy research institutes, and similar organizations. The program also includes a supervised research project and courses on British history and politics, taught at the London School of Economics and Political Science.

London University (Goldsmiths' College). A wide range of course offerings are available to Northeastern students under a direct-credit arrangement. Goldsmiths' is especially noted for its courses in literature, history, theatre, music, communications, and the social sciences. Students may spend the fall and/or winter quarter(s) in London.

Moscow State University Exchange. Courses taught in English on Russian history, politics, economics, and language are featured in this program offered during the spring quarter. A unique feature is a field trip to one of the Russian ethnic areas, to observe the effects of the new revolution on a region remote from Moscow. Students live with Russian families.

Spain: Language and Area Studies. Conducted at the universities of Alicante and Seville, Spain, offering beginning and advanced Spanish language, along with courses in English on various aspects of Spanish culture: history, art history, and economics, with the possibility of an internship placement (for students with advanced-level language skills). Students may go for fall quarter or full year. Includes orientation program in Madrid and homestay with Spanish families.

Sea Education Association. A combination land-sea program covering many aspects of maritime studies, including nautical science and oceanography. A six-week sea voyage provides hands-on experience; destinations include the Bahamas, Caribbean, Nova Scotia, and Newfoundland. Offered during all quarters.

In addition to the above, new programs are frequently in development, and students should periodically contact the Office of International Study Programs in 400 Meserve Hall, 617-373-5162, for an updated list.

Foreign Languages

Business German. Students may use this course as a prerequisite to conversational German courses to prepare for a business-oriented co-op in Germany. This course, taught in English, is designed for students of business and economics seeking competence in reading and understanding texts produced by the German business community and trade media. Additional information may be obtained from Professor Ross Hall in the Department of Modern Languages, 360 Holmes Hall, 617-373-2234.

Elementary Spanish for criminal justice or human services majors. This course is intended for students who will need to use Spanish in police work and in social service settings. The grammar component is the same as that in other elementary Spanish courses. The vocabulary is adapted to particular needs and interests of the students. Students use role-playing extensively and practice "intake" interviews.

French for business and economics students. Designed for students interested in international business, the program offers a thorough study of grammar, insights into the French way of life, specialized vocabulary related to the business world, and an introduction to French business texts. The course is a preliminary step for the student wishing co-op placement in France. Additional information may be obtained from Juliette Gilman, 362 Holmes Hall, 617-373-3659.

Marine Science

East/West Marine Biology Program. The East/West Marine Biology Program allows advanced undergraduate and beginning graduate students in biology and related areas to spend a year of field study in three diverse marine environments.

The program begins in the fall at the University of Washington's Friday Harbor Laboratories, on San Juan Island. In January, students travel to Jamaica to study tropical biology at the Discovery Bay Marine Laboratory on the island's north coast. The final phase of the program is conducted at Northeastern's Marine Science Center in Nahant, Massachusetts. For more information, contact Sara Jordan at 617-595-5597.

Marine Science Center Summer Program in Marine Biology. The summer program allows students to participate in intensive courses at the Marine Science Center (MSC). Students conduct independent research at the MSC laboratory throughout the year. Graduate students from other universities are encouraged to use the laboratory and field sites for thesis research.

Massachusetts Bay Marine Studies Consortium. Northeastern University is a member of the Massachusetts Bay Marine Studies Consortium. The consortium's offerings are interdisciplinary and seek to bridge academic disciplines and current concerns in the marine world. The consortium serves the students and faculty of twenty-two Boston-area colleges and universities. Students from Northeastern may take these classes, which are taught by specialists and government officials. For more information, contact Professor Peter S. Rosen, Department of Geology, 617-373-4380.

The Center for the Arts

The primary mission of the Center for the Arts is to support and develop the arts as a vital and integral component of the Northeastern community. Through a variety of artist-in-residency programs, featuring performing and visual artists acclaimed for their excellence, the center complements the academic arts departments in their effort to educate Northeastern students in becoming knowledgeable, discriminating, and active participants in the arts. In addition, the center supports curriculum-oriented arts projects and events, encourages interdepartmental collaborations, develops exhibitions and presentations that serve the on-campus community as well as the general public, provides multicultural arts programs, and acts as a primary facilitator for research in the arts.

The center also manages the Blackman Auditorium Theatre Complex and operates the nuArts Ticket Center. Tickets to and information about performing and visual arts events and other campus events are available in the ticket center as are tickets and passes to Boston area dance, music, theatre, film, and visual arts events. The ticket center also provides free passes and maintains a University membership to the Museum of Fine Arts that entitles all undergraduate students in the full-time day programs to free membership privileges.

For information on arts activities, please call the Center for the Arts office at 617-373-2249. For ticket information, call the ticket center at 617-373-2247.

African-American Studies

Patrick Manning, PhD, *Professor and Acting Chair*

Associate Professors

Abdul Alkalimat, PhD
Sociology
Jordan Gebre-Medhin, PhD
Anthropology
Maryemna Graham, PhD
Literature
Robert L. Hall, PhD
History
William Lowe, MA
Music
Joseph D. Warren, PhD
Social Welfare

Assistant Professors

Leonard Brown, PhD
Music
Robin Chandler, PhD
Sociology and Art
Elizabeth H. Freydberg, PhD
Theatre
Kwamina Panford, PhD
Law, Policy, and Society
Clark White, PhD
Sociology

Associated Faculty

Oscar Brookins, PhD
Economics
Donald M. Jacobs, PhD
History
William F. Miles, PhD
Political Science

The diverse experiences of black people—in the United States, Africa, the Caribbean, South America, and other parts of the world—are the focus of the field of African-American studies. The curriculum is interdisciplinary in approach and includes historical, social and behavioral, and cultural studies. International studies and contemporary public policy issues are also integral parts of the program. In class, in co-op, and in internships, students apply theoretical knowledge to real-world problems and concerns. Plans for a study abroad program are under way.

Students with training in African-American studies have the knowledge to meet the challenges posed by the diverse racial, cultural, and ethnic groups in the United States and abroad. Many graduates attend professional schools or teach at the secondary or the college level. Others work in museums, libraries, or research centers; in business; or in public service, social service, or law-enforcement agencies.

AFR 1100, Introduction to African-American Studies; AFR 1131, African-American History 1; AFR 1155, Foundations of Black Culture; AFR 1249, Black Community and Social Change; one course on the Black experience outside the United States; and AFR 1355, Senior Seminar.

Five courses from one of three areas of concentration: historical, cultural, or social/behavioral studies. Courses offered in other departments may also satisfy this requirement with departmental approval.

Four courses which will allow students to explore additional topics and areas of interest.

In addition, complete the arts and sciences core curriculum (see page 31).

AFR 1100, Introduction to African-American Studies; AFR 1131, African-American History 1; AFR 1155, Foundations of Black Culture; AFR 1249, Black Community and Social Change; and AFR 1355, Senior Seminar. One course on the Black experience outside the United States. One additional elective selected by the student in consultation with a departmental adviser.

Bachelor of Arts and Bachelor of Science Curriculum

Minor Curriculum

American Sign Language–English Interpreting

Marina L. McIntire, PhD, *Associate Professor and Director*

Teaching Staff

Alma L. Bournazian, MS
James Lipsky, BS
Alice Sykora, MEd

American Sign Language (ASL) is a language used by large numbers of people in the United States and Canada. By mastering ASL, students gain both access to the culture of Deaf America and insights into features of spoken language that are often taken for granted. Learning a modally different language gives students a new sense of the power of language and an appreciation of how it shapes their world. In this way, the mastery of ASL sharpens critical-thinking skills.

The program provides a firm foundation in language, linguistics, culture, and interpreting, plus a broad-based liberal arts education. American Sign Language courses are integral to degrees in human services with a specialization in deaf studies and in linguistics with a focus on ASL.

Opportunities for ASL–English interpreters are increasing, due to recent federal legislation. Graduates work as interpreters in such areas as higher education, advanced technology, and theatre.

The ASL Interpreter Education Project seeks to enhance the skills of interpreters currently working in the field and to increase the supply of competent interpreters in New England.

Bachelor of Science Curriculum

ASL 1101, ASL 1102, American Sign Language 1 and 2; ASL 1201, ASL 1202 Intermediate American Sign Language 1 and 2; ASL 1211, Deaf Culture; ASL 1250, Linguistics of ASL; ASL 1301, ASL 1302, Advanced American Sign Language Proficiency 1 and 2; ASL 1500, Introduction to Interpreting; ASL 1505, ASL 1506, ASL 1507, ASL-English Interpreting 1, 2, and 3; ASL 1520, Interpreter Role and Ethics; ASL 1521, Contrastive Analysis; ASL 1522, Discourse Analysis for Interpreters; ASL 1810, Special Topics in Interpreting; ASL 1820, Interpreting Practicum 1; ENG 1118, Introduction to Language and Linguistics; PSY 1110, Perspectives in Psychology 1; PSY 1112, Foundations of Psychology 2; SOA 1335, Language and Culture; SOC 1100, Introduction to Sociology; and CMN 1110, Voice and Articulation.

One course from the following: ENG 1402, Grammars of English; ENG 1407, Introduction to Semantics; ENG 1408, Topics in Linguistics; ENG 1690, Junior/Senior Seminar; LNL 1235, Applied Linguistics 1; LNL 1240, Bilingualism; PSY 1262, Psychology of Language.

One course from the following: PHL 1165, Moral Problems in Medicine; PSY 1271, Social Psychology; SOC 1102, Social Inequality and Communication; SOC 1135, Social Psychology; SOC 1140, Sociology of Prejudice; SOC 1310, Class, Power, and Social Change.

One course from the following: CRS 1200, Introduction to Special Education; ED 1302, The Human Services Professions; SOC 1240, Sociology of Human Service Organizations.

One course from the following: THE 1160, Movement 1; PSY 1263, Nonverbal Communication; CMN 1111, Oral Interpretation of Literature; CMN 1115, Foundations of Communication; CMN 1330, Interpersonal Communication 1.

In addition, complete the arts and sciences core curriculum (see page 31).

Art and Architecture

Peter Serenyi, PhD, *Professor and Chair*

Professor

Mardges Bacon, PhD

Associate Professors

Samuel S. Bishop, MFA

Mira Cantor, MFA

T. Neal Rantoul, MFA

Assistant Professors

Edwin C. Andrews, MFA

Julie M. Curtis, MFA

Mary Ann Frye, MFA

Dianne W. Pitman, PhD

Monica Ponce de Leon, MAUD

George H. Thrush, MArch

Lecturers

Cynthia L. Baron, MBA

Peter K. Blackburn, MArch

William K. Blake, MFA

Judith Brassard Brown, MFA

David A. Conant, MArch

Richard W. Eifler, MArch

Joseph V. Ferrara, MArch

Christopher D. Ferrier, MFA

Elizabeth A. Gibb, MArch

David J. Hacin, MArch

David J. Hruby, MFA

Joseph R. Iano, MArch

William L. Loftis, MPhil

Uy-Thanh Ly, MS

Joel C. Marcus, MFA

Michael McPherson, MFA

Scott C. Nash, MFA

Robert M. Odegard, MFA

Thomas J. Petit, MFA

Kriss A. Pettersen, BArch

Neil E. Rennie, MFA

Wendy J. Richmond, BA

Kris M. Rodammer, BFA

Joel Sadagursky, BS

H. Mark Schatz, MArch

John R. Stomberg, MA

Nader Tehrani, MAUD

Mary Ann Thompson, MArch

Alfred S. Venditto, BFA

Lawrence C. Volk, MFA

Sandra A. Wheeler, MFA

The visual arts are our oldest form of artistic expression. The ability to understand and use visual language is an increasingly important part of contemporary education.

The department aims to introduce art and architecture as both historical disciplines and creative activities; to offer a focused study of the visual arts, either through a critical examination of the language and the content of art and architecture within the context of a particular historical period, or through hands-on experience in a studio setting; and to offer a solid academic foundation for careers in architecture, graphic design, photography, and teaching the history and the practice of art.

Cooperative education placements for art majors include positions in architecture and design firms, museums, libraries, historical collections, and archives.

The city of Boston, with its superb architecture, museums, galleries, cinemas, and public library, is a primary resource for the department. Encouraging students to take advantage of these resources is a significant aim of the department. In addition, many of Boston's leading artists, architects, and designers teach our studio courses.

Bachelor of Arts and Bachelor of Science Curriculum

Major in art. ART 1100, History of Art to 1400, and ART 1101, History of Art since 1400; ART 1124, Basic Drawing; ART 1130, ART 1131, Visual Studies Foundation 1 and 2; and twelve art electives.

In addition, complete the arts and sciences core curriculum (see page 31).

Concentration in architecture. Leading to a BS degree that is not a professional degree in architecture. The twelve art electives are replaced by four architectural history courses (ART 111, Introduction to Architecture; ART 1203, Medieval Architecture *or* ART 1204, Renaissance Architecture; ART 1225, Modern Architecture 1 *or* ART 1223, American Architecture; and ART 1226, Modern Architecture 2.

Eight architectural studio courses: ART 1156, Architectural Drafting; ART 1150, 1151, 1252, 1253, 1341, 1342, Architectural Design 1 to 6; and ART 1352, Architectural Thesis.

Two computer courses: ART 1190, Introduction to Computer Graphics and ART 1295, Computer Aided Design.

Three building technology courses: ART 1256, ART 1257, Theory of Structures 1 and 2; and ART 1355, Environmental Systems.

Four math/science courses: MTH 1123, MTH 1124, Calculus 1 and 2; PHY 1221, PHY 1222, Physics for Engineering Students 1 and 2.

In addition, complete the arts and sciences core curriculum (see page 31).

Concentration in graphic design. Same requirements as for the art major, except that the twelve art electives are replaced by: ART 1132, Principles of Graphics; ART 1133, Graphic Design 1; ART 1134, Typography 1; ART 1144, Typography 2; ART 1160, Introduction to Photography; ART 1180, Video Basics; ART 1190, Introduction to Computer Graphics; ART 1213, Modern Art; ART 1230, History of Photography *or* ART 1237, Contemporary Directions in Cinema; ART 1240, History of Graphic Design; ART 1243, Graphic Design 2; ART 1244, Graphic Design 3; ART 1250, Color Theory and Practice; ART 1254, Intermediate Drawing; ART 1263, Introduction to Color Photography; ART 1280, Media Graphics; ART 1290, Electronic Publishing Design; ART 1291, Intermediate Computer Graphics Workshop; and ART 1330, Advanced Visual Communication.

In addition, complete the arts and sciences core curriculum (see page 31).

Minor Curriculum

General minor. Select any six courses from the departmental curriculum.

Minor in history of architecture. ART 1203, Medieval Architecture; ART 1204, Renaissance Architecture; ART 1223, American Architecture; ART 1225, ART 1226, Modern Architecture 1 and 2; and ART 1310, Seminar in Modern Architecture.

Minor in architecture. ART 1111, Introduction to Architecture; ART 1124, Basic Drawing *or* ART 1156, Architectural Drafting; *or* GE 1130, Engineering Design and Graphics; ART 1226, Modern Architecture 2; ART 1150, Architectural Design 1; ART 1151, Architectural Design 2; and ART 1252, Architectural Design 3; *one of the following:* ART 1253, Architectural Design 4; *or* ART 1295, Computer Aided Design; *or* ART 1355, Environmental Systems.

Minor in studio art. ART 1124, Basic Drawing; ART 1127, Basic Painting; ART 1130, Visual Studies Foundation 1; ART 1132, Principles of Graphics; ART 1138, Introduction to Printmaking; and ART 1243, Graphic Design 2 *or* ART 1254, Intermediate Drawing.

Minor in graphic design. ART 1130, ART 1131, Visual Studies Foundation 1 and 2; ART 1132, Principles of Graphics; ART 1134, Typography; ART 1133, Graphic Design 1; and ART 1250, Color Theory and Practice.

Minor in photography. ART 1160, Introduction to Photography; ART 1261, Intermediate Black and White Photography; ART 1230, History of Photography; ART 1233, Contemporary Directions in Photography; ART 1263, Introduction to Color Photography; and ART 1363, Advanced Photography Seminar.

Behavioral Neuroscience

The behavioral neuroscience major is a unit of academic coordination for undergraduates. It does not have faculty appointments or separate space, but does have a head advisor/director and an advisory board made up of the neuroscience faculty of the College of Arts and Sciences. The overall objective of the neuroscience major program is to draw together faculty and students who are interested in this interdisciplinary topic to provide undergraduates with an education in the field. Behavioral neuroscience focuses on brain mechanisms and how they give rise to behavioral functions in humans and animals. The field combines the disciplines of biology and psychology with a strong background in basic physical sciences and mathematics. The goal is to achieve an understanding of nerve cells, chemical neurotransmission, simple neural circuits and other physiological

systems and then to see how they give rise to normal and pathological behavioral functioning. Studies range from the molecular to the molar as seen in the example of a drug which interacts with specific protein molecules or receptors in nerve cell membranes but also can be used to alter behavior. The curriculum prepares students to find employment in allied fields such as the bio-tech industry or to gain entrance to higher degree granting programs in graduate or medical school. For further information on the behavioral neuroscience major, contact Alexander A. Skavenski, director and professor of psychology, at 617-373-3043.

Bachelor of Science Curriculum

Psychology: PSY 1110, Perspectives in Psychology 1 or PSY 1111, Foundations of Psychology 1; PSY 1112, Foundations of Psychology 2 or PSY 1113, Perspectives in Psychology 2; PSY 1211, Behavioral Statistics 1; PSY 1212, Behavioral Statistics 2; PSY 1351, Psychobiology; PSY 1451, Psychopharmacology; PSY 1551, Psychobiology Laboratory.

One course from the following: PSY 1241, Developmental Psychology; PSY 1271, Social Psychology; PSY 1272, Personality 1; PSY 1373, Abnormal Psychology 1.

Two courses from the following: PSY 1231, Learning and Motivation 1; PSY 1262, Psychology of Language; PSY 1353, Animal Behavior; PSY 1364, Cognition; PSY 1365, Language and the Brain; PSY 1381, Sensation; PSY 1382, Perception.

Biology: BIO 1103, Principles of Biology 1; BIO 1104, Principles of Biology 2; BIO 1260, Genetics and Developmental Biology; BIO 1261, Introductory Biochemistry; BIO 1350, Regulatory Physiology.

Two Biology courses from the following: BIO 1311, Evolution; BIO 1341, Vertebrate Zoology; BIO 1347, Embryology; BIO 1348, Animal Histology; BIO 1351, Comparative Vertebrate Anatomy; BIO 1452, Comparative Neurobiology; BIO 1454, Comparative Vertebrate Physiology; BIO 1457, Neuroethology; BIO 1462, General Biochemistry Laboratory; BIO 1463, General Biochemistry 3; BIO 1467, Molecular Biology.

Mathematics and Chemistry: MTH 1106, Functions and Algebra and MTH 1107, Functions and Calculus and MTH 1108, Calculus; or MTH 1133, 1134, and 1135, Calculus for Biology Majors 1, 2, and 3; CHM 1111, General Chemistry for the Life Sciences 1; CHM 1112, General Chemistry for the Life Sciences 2A; CHM 1122, General Chemistry for the Life Sciences 2B; CHM 1264, Organic Chemistry for Biology Science Majors 1; CHM 1265, Organic Chemistry for Biology Science Majors 2.

Seminar: PSY 1651, Psychobiology or BIO 1490, Seminar in Biology.

BS Core Curriculum: For Natural Science majors, but excluding PSY 1110, PSY 1113, Perspectives in Psychology 1.

Note: if MTH 1107 is taken for Core Category 1, then take seven elective courses.

Electives: Select six courses. Recommended courses include: PHY 1201, PHY 1202, and PHY 1203, Physics for the Life Sciences 1, 2, and 3; and two Directed Study courses toward a Senior Honors Project or equivalent.

Biochemistry

Biochemistry includes nearly the entire spectrum of science—from physics and chemistry to biology and medicine. The biochemistry major, sponsored jointly by the departments of biology and chemistry, provides a strong foundation in mathematics and the physical sciences as well as thorough training in biochemistry, biology, and chemistry. In addition to formal classwork, opportunities are available for participation in faculty research programs on an individual basis or through the honors program. The large number of biotechnology companies and biomedical facilities in the Boston area provides a rich source of opportunities through Northeastern's program of cooperative education.

A Bachelor of Science degree in biochemistry allows students to enter the job market directly or go on to graduate, medical, veterinary, dental, law, or business school. Students may find positions in biotechnology companies, drug companies, or government agencies, working in laboratory or clinical research, quality control, production, information systems, marketing, or technical sales. Students may also pursue graduate study in biochemistry, molecular biology, cell biology, biophysics, genetics, toxicology, biotechnology, clinical chemistry, animal science, nutrition, plant science, or other biomedical sciences.

Students who are interested in attending medical, dental, or veterinary school following graduation are urged to consult with the preprofessional advisory committee early in their careers at Northeastern.

Bachelor of Science Curriculum

BIO 1103, BIO 1104, BIO 1105, Principles of Biology 1, 2, and 3; BIO 1260, Genetics and Developmental Biology; BIO 1461, General Biochemistry I; BIO 1462, General Biochemistry Lab; BIO 1463, General Biochemistry 3; BIO 1467, Molecular Biology; and BIO 1480, Senior Biochemistry Seminar.

CHM 1111, CHM 1122, General Chemistry for Life Sciences 1 and 2 *or* CHM 1151, CHM 1152, General Chemistry for Science Majors 1 and 2; CHM 1153, The Chemical Elements; CHM 1221, Analytical Chemistry; CHM 1271, CHM 1272, CHM 1273, Organic Chemistry for Chemistry Majors 1, 2, and 3; *or* CHM 1264, CHM 1265, Organic Chemistry for Biology Science Majors 1 and 2; and CHM 1280, CHM 1281, Physical Chemistry 1 and 2.

MTH 1140, MTH 1141, MTH 1142, Calculus for Science Majors 1, 2, and 3 *or* MTH 1133, MTH 1134, MTH 1135, Calculus for Biology Majors 1, 2, and 3; PHY 1201, PHY 1202, PHY 1203, Physics for Life Sciences 1, 2, and 3; two quarters of corresponding physics lab courses; six advanced biology and chemistry electives (minimum of two from each discipline); and demonstrated computer literacy.

In addition, complete the arts and sciences core curriculum (see page 31).

Biology

David C. Wharton, PhD, *Professor and Chair*

Professors

Gwilym S. Jones, PhD
Charles A. M. Meszoely, PhD
M. Patricia Morse, PhD
Fred A. Rosenberg, PhD
Ernest Ruber, PhD
Phyllis R. Strauss, PhD
Carol M. Warner, PhD

Associate Professors

Joseph L. Ayers, PhD
Kostia Bergman, PhD
Donald P. Cheney, PhD
Frederick C. Davis, PhD

H. William Detrich, PhD

Charles H. Ellis, Jr., PhD
Helen H. Lambert, PhD
Richard L. Marsh, PhD
Jacqueline M. Piret, PhD
Susan Powers-Lee, PhD
Daniel C. Scheirer, PhD
Wendy A. Smith, PhD

Professors Emeriti

Francis D. Crisley, PhD
Charles Gainor, PhD
Nathan W. Riser, PhD

Adjunct Professors

Bruce B. Collette, PhD
Sergei Kashin, PhD

Adjunct Associate Professors

Dennis Bazylnski, PhD
Stephen Brecher, PhD

Adjunct Assistant Professor

Slava S. Epstein, PhD

By majoring in biology, students develop a basic understanding of the organization and the processes of life, from molecules and cells through organs and organ systems to populations, species, ecosystems, and evolution. The major offers the mathematical, chemical, and physical background necessary for understanding biology and the practical scientific skills associated with each of these areas. It allows students to begin to specialize in a subdiscipline of biology such as animal physiology, cell biology, ecology, marine biology/microbiology, molecular biology, plant biology, zoology, etc. Numerous opportunities for relevant positions are available through Northeastern's program of cooperative education.

Students who decide to major in biology in the freshman or sophomore year may follow the prescribed academic sequence; students who enter the major in the middler year may complete the major in the normal time by taking some electives concurrently with the biology core, or Biocore, courses. After completing the Biocore, students interested in independent research may arrange to undertake a more extensive honors program involving up to four quarters of research.

To graduate with a major in biology, a student must have a cumulative quality-point average (QPA) of 2.0 for all science and mathematics courses required for the major. The Bachelor of Arts and Bachelor of Science degrees require a modern language. The Bachelor of Science program is more extensive in its mathematics and science requirements and may offer better preparation for some areas of postgraduate study. The department publishes *The Biology Undergraduate Advisory Book*, which explains the required and recommended courses and the QPA standards for biology majors. The advisory book is available in the Department of Biology, 414 Mugar Hall.

The undergraduate biology major prepares students for careers in the life sciences, including medical, dental, and other health-related fields. Students may find employment in federal, state, industrial, hospital, or university laboratories or in industries involved in the manufacture and distribution of pharmaceuticals, biological products, food, or scientific equipment. Biologists also work in fisheries, forestry services, county and state agencies, museums, aquariums, research vessels, and marine stations.

Graduate study culminating in a master's or doctoral degree can lead to careers in upper-level teaching or research in any of the life sciences.

Premedical or predental students are urged to consult with the preprofessional advisory committee early in their careers at Northeastern.

Bachelor of Arts Curriculum

BIO 1103, BIO 1104, BIO 1105, Principles of Biology 1, 2, and 3; BIO 1211, Environmental and Population Biology; BIO 1260, Genetics and Developmental Biology; BIO 1261, Introductory Biochemistry; and four advanced biology electives approved by department Advisory Committee.

MTH 1106, Fundamentals of Mathematics, MTH 1107, Functions and Basic Calculus, *or* Calculus (one year); PHY 1201 and PHY 1202, *or* PHY 1203, Physics for the Life Sciences 1 and 2, *or* 3, and PHY 1501, PHY 1502, Physics Lab for the Life Sciences 1 and 2, *or* PHY 1221 and PHY 1222, Physics for Science and Engineering Students 1 and 2, and PHY 1521 and PHY 1522, Physics Lab for Science and Engineering Students 1 and 2, *or* PHY 1223, Physics for Science and Engineering Students 3 and PHY 1523, Physics Lab for Science and Engineering Students 3; CHM 1111, General Chemistry I; CHM 1122, General Chemistry 2; CHM 1221, Analytical Chemistry; and CHM 1264, CHM 1265, Organic Chemistry 1 and 2.

In addition, complete the arts and sciences core curriculum (see page 31).

Bachelor of Science Curriculum

BIO 1103, BIO 1104, and BIO 1105, Principles of Biology 1, 2, and 3; BIO 1211, Environmental and Population Biology; BIO 1260, Genetics and Developmental Biology; BIO 1261, Introductory Biochemistry; BIO 1490, Senior Seminar; four advanced biology electives approved by department Advisory Committee.

Calculus (one year); PHY 1221, PHY 1222, and PHY 1223, Physics for Science and Engineering Students 1, 2, and 3; PHY 1531, PHY 1532, Physics Lab for Science Majors 1 and 2 *or* PHY 1523, Physics Lab for Science and Engineering Students 3; CHM 1111 and CHM 1122, General Chemistry 1 and 2; CHM 1221, Analytical Chemistry; CHM 1264 and CHM 1265, Organic Chemistry 1 and 2; and two additional advanced science electives approved by department Advisory Committee.

In addition, complete the arts and sciences core curriculum (see page 31).

Minor Curriculum

A minor in biology consists of any six biology courses for which the student has the prerequisites, plus two more courses in biology or other departments that serve as prerequisites for biology courses. At least five of the total eight courses must include laboratory, and a student may not count toward the biology minor more than one course, or course sequence, that covers substantially the same material.

To accommodate the needs of students majoring in different fields, the biology minor requirements have been phrased in a general and flexible way. To ensure that course selection is sound and appropriate to the student's background, each student's biology minor program must receive the signed approval of the biology minor advisor before the student has completed the first biology course.

Suggested course groupings for a biology minor have been developed for students with different backgrounds in college mathematics and science. The core minor for students with considerable work in mathematics, chemistry, or physics provides the foundation on which a biology major is built, without advanced specialization. For students with less college mathematics/science background, or none, three other minor options provide the opportunity for first-level exposure to the basic principles of biology. This option also gives students an opportunity to achieve some advanced specialization in plant and/or animal studies or to explore human biology, molecular biology, biochemistry, and the problems of the environment.

For further information, contact the biology minor adviser in 414 Mugar, 373-2260.

Chemistry

William M. Reiff, PhD, *Professor and Chair*

Professors

Geoffrey Davies, PhD
David A. Forsyth, PhD
Bill C. Giessen, DrScNat
Barry L. Karger, PhD
Philip W. LeQuesne, PhD, DSci
Mary Jo Ondrechen, PhD
John L. Roebber, PhD
Alfred Viola, PhD
Paul Vouros, PhD
Philip M. Warner, PhD

Associate Professors

Thomas R. Gilbert, PhD
Ira S. Krull, PhD
Kay D. Onan, PhD

Assistant Professors

David E. Budil, PhD
David J. Jebaratnam, PhD
Lutfur R. Khundkar, PhD
Rein U. Kirss, PhD
Patricia A. Mabrouk, PhD

Laboratory Coordinator

Edward H. Witten, PhD

The study of chemistry focuses on the structure and properties of substances and the transformations they undergo. The department seeks to help students experience the intellectual stimulation of studying a physical science; grasp the basic principles and techniques of chemistry; and prepare for graduate study in chemistry, medicine, dentistry, or many other related fields.

Students in our Cooperative Education program can obtain invaluable practical professional experience to augment their classroom work. For many, these practical applications help to put their course work into a logical framework and help provide perspective. Electives, especially in the last two years, allow students to concentrate in those areas which have a special interest for them. The department encourages qualified students to undertake a research project under the supervision of a faculty member. An honors program is open to particularly able students.

The department publishes *Chemistry at Northeastern*, a pamphlet that details the chemistry major requirements. Copies may be obtained from 102 Hurtig Hall.

The Department of Chemistry offers two degree programs. The Bachelor of Science degree has more explicit scientific course requirements, while the Bachelor of Arts degree has more extensive requirements outside of the sciences. Both of the programs at Northeastern are approved by the American Chemical Society. The Bachelor of Science degree meets the society's requirements for certification; certified graduates are eligible for full membership in the society after two years of professional experience.

The Department of Chemistry also offers a Bachelor of Science with an Interdisciplinary Option. In this program some of the courses required for a traditional BS in chemistry have been replaced with required and elective courses focused on one of several disciplines, including business administration, education, environmental science, and law and public policy. The options are offered because chemists frequently take jobs that require knowledge and skills not provided by the traditional chemistry major program. The options programs add breadth to the curriculum for chemistry majors while still providing a technical core of math, physics, and chemistry courses. More information about these options are contained in the pamphlet *Options for Chemistry Majors* available from the Chemistry Department.

Bachelor of Arts Curriculum

CHM 1151, CHM 1152, General Chemistry for Science Majors 1 and 2; CHM 1231, Analytical Chemistry for Chemistry Majors; CHM 1271, CHM 1272, CHM 1273, Organic Chemistry for Chemistry Majors and Chemical Engineering Students 1, 2, and 3; CHM 1381, CHM 1382, CHM 1383, Physical Chemistry 1, 2, and 3; CHM 1394, CHM 1395, CHM 1396, Experimental Physical Chemistry 1, 2, and 3; CHM 1422, Instrumental Methods of Analysis; and CHM 1432, Instrumental Analysis Lab.

MTH 1140, MTH 1141, MTH 1142, Calculus 1, 2, and 3; MTH 1243, Calculus and Linear Methods 1 or MTH 1223, Calculus 4; PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3; and PHY 1522, PHY 1533, Physics Lab for Science Majors 2 and 3.

In addition, complete the arts and sciences core curriculum (see page 31).

Bachelor of Science Curriculum

CHM 1151, CHM 1152, General Chemistry for Science Majors 1 and 2; CHM 1231, Analytical Chemistry for Chemistry Majors; CHM 1271, CHM 1272, CHM 1273, Organic Chemistry for Chemistry Majors and Chemical Engineering Students 1, 2, and 3; CHM 1381, CHM 1382, CHM 1383, Physical Chemistry 1, 2, and 3; CHM 1394, CHM 1395, CHM 1396, Experimental Physical Chemistry 1, 2, and 3; CHM 1422, Instrumental Methods of Analysis; CHM 1432, Instrumental Analysis Lab; CHM 1441, Advanced Inorganic Chemistry; CHM 1451, Experimental Inorganic Chemistry; CHM 1461, Identification of Organic Compounds; CHM 1811, Advanced Chemical Lab Practice 1; and two advanced science or mathematics electives.

MTH 1140, MTH 1141, MTH 1142, Calculus 1, 2, and 3; MTH 1243, Calculus and Linear Methods 1 or MTH 1223, Calculus 4; MTH 1245, Differential Equations and Linear Methods 1 or MTH 1225, Mathematical Analysis; PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3; and PHY 1522, PHY 1533, Physics Lab for Science Majors 2 and 3.

Bachelor of Science with an Interdisciplinary Option

CHM 1151, CHM 1152, General Chemistry for Science Majors 1 and 2; CHM 1231, Analytical Chemistry for Chemistry Majors; CHM 1264, CHM 1265, Organic Chemistry 1 and 2; CHM 1381, CHM 1382, Physical Chemistry 1 and 2; CHM 1394, CHM 1395, Experimental Physical Chemistry 1 and 2; CHM 1422, Instrumental Methods of Analysis; CHM 1432, Instrumental Analysis Lab; MTH 1133, MTH 1134, MTH 1135, Calculus 1, 2, and 3; PHY 1201, PHY 1202, PHY 1203, Physics 1, 2, and 3; PHY 1501, PHY 1502, PHY 1503, Physics Lab 1, 2, and 3; and two math or science electives and the required and elective courses in the interdisciplinary area.

In addition, complete the arts and sciences core curriculum (see page 31).

Minor Curriculum

After a general chemistry sequence, CHM 1231, Analytical Chemistry for Chemistry Majors; CHM 1271, CHM 1272, CHM 1273, Organic Chemistry for Chemistry Majors and Chemical Engineering Students 1, 2, and 3; or CHM 1264, CHM 1265, Organic Chemistry 1 and 2; CHM 1381, CHM 1382, Physical Chemistry 1 and 2; and CHM 1394, CHM 1395, Experimental Physical Chemistry 1 and 2.

Communication Studies

Richard A. Katula, PhD, *Professor and Chair*

Associate Professors

Karen S. Buzzard, PhD
Carl W. Eastman, MA
Joanne Morreale, PhD
Michael L. Woodnick, MS
Alan J. Zaremba, PhD

Assistant Professors

Simon Jones, PhD
Anne Mattina, PhD

Instructors

Thomas Shaker, MA
Sherry Shepler, MA

Communication studies offers students a humanities-based, liberal arts education coupled with pre-professional training.

Students who major in communication studies learn to speak articulately and persuasively in a variety of situations, understand the history and traditions of the field of communication, and comprehend the business and technology of the communications industry. The program also helps students appreciate the aesthetics of human communication, communicate effectively in complex organizations such as businesses and government agencies, understand theories of human communication and research methods used to develop and support those theories, and effectively criticize and consume messages produced in public argument and mass communication media.

The department offers coursework in speech skill development, radio and television production and broadcasting, communication theories, and criticism.

Bachelor of Arts and Bachelor of Science Curriculum

CMN 1115, Foundations of Communication; CMN 1116, Public Speaking; CMN 1250, Introduction to Mass Communication; CMN 1300, Communication Theory; CMN 1330, Interpersonal Communication; CMN 1600, Introduction to Communication Research; and CMN 1610, Rhetorical Criticism.

In addition to the core courses, communication studies majors may choose from one of three concentrations: speech and rhetoric, organizational communication, and radio and television. Concentrations require five courses. In addition, three upper-level communication studies courses are required to complete the major.

Concentration in speech and rhetoric. CMN 1110, Voice and Articulation; CMN 1111, Oral Interpretation of Literature; CMN 1210, Advanced Voice and Articulation; CMN 1211, Advanced Oral Interpretation; CMN 1232, Communication and Gender; CMN 1239, Argumentation and Debate; CMN 1240, Advanced Studies in Speech Performance; CMN 1310, Classical Age in Speech and Rhetoric; CMN 1315, Theories of Persuasion; CMN 1410, Contemporary Public Address; CMN 1415, Persuasion in Contemporary Culture; and CMN 1500, Special Topics in Communication Studies.

Concentration in organizational communication. CMN 1232, Communication and Gender; CMN 1315, Theories of Persuasion; CMN 1318, Negotiation Skills; CMN 1331, Advanced Interpersonal Communication; CMN 1338, Group Discussion; CMN 1430, Organizational Communication; CMN 1431, Advanced Organizational Communication; CMN 1437, Consultation Skills; CMN 1453, Broadcast Management; CMN 1500, Special Topics in Communication Studies; CMN 1555, Communication and the Quality of Life.

Concentration in radio and television. CMN 1232, Communication and Gender; CMN 1315 Theories of Persuasion; CMN 1317, The Audience in Mass Communication; CMN 1415, Persuasion in Contemporary Culture; CMN 1430, Organizational Communication; CMN 1450, Television Studio Production; CMN 1451, Foundation of Broadcast Technology; CMN 1452, Radio Production; CMN 1453, Broadcast Management; CMN 1454, Programming for Radio and Television; CMN 1455, Television Field Production; CMN 1554, Special Topics in Media.

CMN 1895, CMN 1896, Internship in Communication Studies, and CMN 1890, CMN 1891, CMN 1892, Directed Study, may be taken for credit in any of the three concentration areas.

Minor Curriculum

CMN 1116, Public Speaking; CMN 1300, Introduction to Communication Theory; CMN 1330, Interpersonal Communication; and CMN 1338, Group Discussion.

Four courses from the following: CMN 1110, Voice and Articulation; CMN 1111, Oral Interpretation of Literature; CMN 1232, Communication and Gender; CMN 1239, Argumentation and Debate; CMN 1250, Introduction to Mass Communication; CMN 1318, Negotiation Skills; CMN 1331, Advanced Interpersonal Communication; CMN 1410, Contemporary Public Address; CMN 1415, Techniques of Persuasion; CMN 1437, Consultation Skills; CMN 1430, Organizational Communication; CMN 1600, Introduction to Communication Research; and CMN 1610, Rhetorical Criticism. Individual programs may be approved through the Communication Studies Department.

Economics

John Adams, PhD, *Professor and Chair*

Professors

M. Shahid Alam, PhD
Barbara M. Fraumeni, PhD
Harold M. Goldstein, PhD
Irwin L. Herrnstadt, PhD
Sungwoo Kim, PhD
Steven A. Morrison, PhD
Gustav Schachter, PhD
Andrew M. Sum, MA

Associate Professors

Neil O. Alper, PhD
Bruce R. Bolnick, PhD
Oscar T. Brookins, PhD
Kamran N. Dadkhah, PhD
Alan W. Dyer, PhD
Gregory Wassall, PhD

Assistant Professors

Gopa Chowdhury-Bose, PhD
Jonathan H. Haughton, PhD
Manfred W. Keil, PhD
Katherine A. Kiel, PhD
Stephen L. Parente, PhD
George A. Plesko, PhD

Professor Emeritus

Morris A. Horowitz, PhD

Economics is the study of how societies produce and exchange goods and services to satisfy material needs. Economists analyze the process of economic growth and change and identify policies that contribute to its success or failure.

In the economics program students examine the sources of economic growth—how societies produce more of what they need. Undergraduates study economics as part of a broad interest in the social sciences to develop specialized skills useful in today's complex labor market. The major in economics is a good foundation for graduate studies in advanced economics, public policy, law, or business.

Macroeconomics, which focuses on the overall economy, deals with such problems as inflation, unemployment, growth and instability, economic development, and governmental monetary and fiscal policies.

Microeconomics examines the economic behavior of individuals, households, firms, industries, and trade among countries. It seeks to assess the economic effects of market power and environmental damage and analyzes the economic aspects of natural resources, poverty, health, income distribution, trade unions, and government regulation.

Courses in economics cover international trade; the behavior of families, firms, and industries in the market economy; the environmental costs of growth; and the economic aspects of natural resources, poverty, health, labor market discrimination affecting women and minorities, trade unions, and governmental oversight. International and comparative perspectives are emphasized, most directly in courses in economic development of the Third World and economic history.

Graduates may find jobs in federal, state, and local governments, major corporations, or financial institutions. Their work may involve planning and forecasting, assessing labor needs, and making financial studies. They may estimate consumer demand for new products, conduct research, teach, or provide specialized consulting services.

Bachelor of Arts Curriculum

ECN 1115, Principles of Macroeconomics; ECN 1116, Principles of Microeconomics; ECN 1250, ECN 1251, Statistics 1 and 2; ECN 1215, Macroeconomic Theory; ECN 1216, Microeconomic Theory; ECN 1337, History of Economic Thought; six economics electives. MTH 1113, College Mathematics for Business and Economics; MTH 1114, Calculus for Business and Economics; and four social science electives other than economics.

In addition, complete the arts and sciences core curriculum (see page 31).

Bachelor of Science Curriculum

ECN 1115, Principles of Macroeconomics; ECN 1116, Principles of Microeconomics; ECN 1250, ECN 1251, Statistics 1 and 2; ECN 1215, Macroeconomic Theory; ECN 1216, Microeconomic Theory; ECN 1351, Problems in Economic Research; and ten economics electives. MTH 1113, College Mathematics for Business and Economics; MTH 1114, Calculus for Business and Economics; and four social science electives other than economics.

In addition, complete the arts and sciences core curriculum (see page 31).

Minor Curriculum

ECN 1115, Principles of Macroeconomics; ECN 1116, Principles of Microeconomics; ECN 1215, Macroeconomic Theory; ECN 1216, Microeconomic Theory; and four electives in economics. Electives to be selected with the advice of a department adviser and cannot include ECN 1250, Statistics 1, or ECN 1251, Statistics 2, if comparable courses are required by the major department. Any course taken outside the Department of Economics to satisfy these economics elective requirements must be approved by a faculty adviser in the department.

Education

Maurice Kaufman, PhD, *Professor and Chair*

Professors

Mervin D. Lynch, PhD
Sandra M. Parker, EdD

Associate Professors

Nicholas J. Buffone, PhD
Leslie A. Burg, EdD
Mary J. Lee, MEd
Joseph Meier, EdD
Irene A. Nichols, EdD
Barbara A. Schram, EdD

Assistant Professor

Thomas H. Clark, MA

Professor Emeritus

John D. Herzog, PhD

The Department of Education helps students to understand principles of curriculum, instruction, and evaluation; to analyze and think critically about teaching and learning; to communicate effectively; and to understand the legal and moral responsibilities of the teaching profession. The department offers undergraduate programs that enable students to obtain provisional Massachusetts teacher certification, which is recognized in other states. (Full certification requires a master's degree.) All students who seek teaching certificates in Massachusetts need degrees that consist of a major in the arts and sciences and a program of study in education. Students acquire specified competencies established for certification in Massachusetts through designated courses, related fieldwork, cooperative education experiences, and full-time student teaching arranged by the education department.

Early Childhood Education and Elementary Education

Students who wish to obtain certification as early childhood or elementary education teachers complete a major in the arts and sciences and enroll in a program of education courses. For specific education program course requirements, students should consult the *1995–1996 College of Arts and Sciences Guidebook*.

Secondary Education

Students seeking high-school teacher certification should enroll in an arts and sciences major and a minor in secondary education.

Students preparing to teach biology, chemistry, earth science (geology), English, history, mathematics, physics, or foreign languages in Massachusetts schools should major in the pertinent field. Students majoring in economics, history, political science, or sociology may pursue certification in the teaching of social studies.

Secondary education minor. CRS 1200, Introduction to Special Education; ED 1103, Human Development and Learning 2; ED 1104, Analysis of the Instructional Process; ED 1306, Measurement and Evaluation; ED 1410, ED 1411, Methods and Materials for Teaching Adolescents 1 and 2; ED 1412, Fundamentals of Curriculum Development; and ED 1417, Student Teaching and Seminar.

Student Teaching

Student teaching is a full-time experience for one quarter of the senior year. A professor and a cooperating classroom teacher share supervisory responsibility.

English

Stuart S. Peterfreund, PhD, *Professor and Chair*

Professors

Samuel J. Bernstein, PhD
Robert J. Blanch, PhD
Francis C. Blessington, PhD
Irene Fairley, PhD
Wayne Franklin, PhD
Gary Goshgarian, PhD
Earl N. Harbert, PhD
Guy Rotella, PhD
Michael Ryan, PhD
Herbert L. Sussman, PhD

Arthur J. Weitzman, PhD
Joseph E. Westlund, PhD
Kristin Woolever, PhD

Associate Professors

Timothy R. Donovan, PhD
Maryemma Graham, PhD
Kathleen Kelly, PhD
Mary K. Loeffelholz, PhD
Janet Randall, PhD
Bonnie TuSmith, PhD
Susan Wall, PhD

Assistant Professors

Kathy Howlett, PhD
Marina Leslie, PhD
Linda Loehr, PhD
Barbara Rodriguez, PhD

Lecturers

Joseph B. deRoche, MFA
David W. Tutein, MA

The department offers courses in creative, expository, and technical writing; linguistics; literary studies; and American and British literature.

Students who have completed the freshman English requirement and are in good academic standing may major or minor in English. The broad-based major requires proficiency in a number of approaches—including historical, generic, and theoretical—to the study of language and literature. The more narrowly focused minor gives students intensive exposure to literature, writing, linguistics, or technical communication.

English majors prepare for careers in teaching and research, advertising and publishing, radio and television—any field in which communication and critical judgment go hand in hand. The department

also offers an intellectual and cultural framework for preprofessional students in law, medicine, business, engineering, or computer science.

Bachelor of Arts and Bachelor of Science Curriculum

ENG 1126, Backgrounds in English and American Literature; ENG 1120, ENG 1121, Survey of English Literature 1 and 2; ENG 1123, ENG 1124, Survey of American Literature 1 and 2; ENG 1307, Approaches to Literature; two period courses; three major figure courses (one must be Shakespeare); one language or writing course; one genre course; one alternative literature course; one junior/senior seminar; and three electives in English.

In addition, complete the arts and sciences core curriculum (see page 31).

Concentration in creative writing. ENG 1109, Introduction to Creative Writing; ENG 1351, Creative Writing; one course from the following: ENG 1356, Drama Workshop; ENG 1357, Poetry Workshop; ENG 1358, Fiction Workshop; ENG 1359, Nonfiction Workshop; ENG 1360, Topics in Writing; and must complete ENG 1362, Publication Arts.

Concentration in literature. One language or writing course from the following: ENG 1118, Introduction to Language and Linguistics; ENG 1119, History of the English Language; ENG 1351, Creative Writing; ENG 1352, Advanced Writing; ENG 1357, Poetry Workshop; ENG 1358, Fiction Workshop; ENG 1359, Nonfiction Workshop; and three English electives.

Minor in Literature Curriculum

Six courses required, two from the following: ENG 1120, Survey of English Literature 1; ENG 1121, Survey of English Literature 2; ENG 1123, Survey of American Literature 1; ENG 1124, Survey of American Literature 2; one course from two of the following categories: (a) literary periods, (b) major figures, and (c) language and writing; one elective from (a), (b) or (c); a junior/senior seminar.

Minor in Writing Curriculum

Six courses required, four from the following: ENG 1350, Intermediate Writing; ENG 1351, Creative Writing; ENG 1125, Technical Writing 1; ENG 1370, Technical Writing 2; ENG 1352, Advanced Writing; ENG 1381, Writing for the Professions: Business Administration; ENG 1382, Writing for the Professions: Criminal Justice; ENG 1357, Poetry Workshop; ENG 1358, Fiction Workshop; ENG 1362, Publication Arts; ENG 1359, Nonfiction Workshop; and two writing or literature electives.

Minor in Linguistics Curriculum

See page 34.

Minor in Technical Communication Curriculum

See page 35.

Geology

Richard H. Bailey, PhD, *Professor and Chair*

Professors

Richard S. Naylor, PhD
William A. Newman, PhD

Associate Professors

Bernard L. Gordon, MS
Peter S. Rosen, PhD
Martin E. Ross, PhD

Geology is a broad-based science that deals with the study of the physical features, composition, history, and processes of the earth. Many geologists today are working to solve environmental problems, to develop and protect water resources, and to discover new deposits of minerals and fossil fuels.

Bachelor of Science and Bachelor of Arts programs are offered in geology and in environmental geology. These programs require coursework in mathematics (through calculus), physics, and chemistry, and a set of required and elective geology courses. All students complete the College of Arts and Sciences core. Students in the Bachelor of Arts programs take a broader array of non-science courses and must demonstrate proficiency in a foreign language (through intermediate II level). Courses in the geology major focus on the basic composition (mineralogy and petrology), structure (structural geology and stratigraphy), and surface of the earth (geomorphology and geochemistry). The environmental geology major has a greater emphasis on earth surface processes, human interactions, and land-use planning. Typical environmental geology courses include hydrogeology, land-use planning, water in environmental planning, groundwater geochemistry, and coastal processes.

Fieldwork is an essential component of training in geology, and many of our courses utilize field sites throughout New England to demonstrate geological processes. In addition to these local trips, the department has taken students on longer field excursions to the Cascade Mountains of Washington, to the island of San Salvador in the Bahamas, to the Grand Canyon, and to the Black Hills of South Dakota. Students also have the option to complete undergraduate research courses with a faculty member. Undergraduate research projects usually involve substantial field and lab work completed under the guidance of the geology faculty. Honors students in geology have the opportunity to participate in special sections of geology courses and in special honors activities.

The geology program offers basic knowledge needed to work in almost any of the geologic professions in both industry and government, or to continue studies in graduate school. The major in environmental geology is particularly popular, and many of our recent graduates work for environmental or geotechnical firms. Students involved in the optional co-op plan typically work with local engineering, environmental consulting companies, or with government agencies. These jobs often involve assessing building sites, evaluating land use, and studying many problems concerned with groundwater contamination and remediation.

**Bachelor of Arts in
Geology Curriculum**

GEO 1212, Physical Geology; GEO 1213, Physical Geology Lab; GEO 1222, Historical Geology; GEO 1223, Historical Geology Lab; GEO 1310, Descriptive Mineralogy; GEO 1308, Petrology; GEO 1440, Geomorphology; GEO 1418, Structural Geology; and five geology electives.

MTH 1106, Fundamentals of Mathematics and MTH 1107, Functions and Basic Calculus *or* MTH 1107, Functions and Basic Calculus and MTH 1108, Calculus; PHY 1221, Physics for Science and Engineering Students *or* PHY 1201, Physics for the Life Sciences 1; CHM 1111, CHM 1122, General Chemistry 1 and 2.

In addition, complete the arts and sciences core curriculum (see page 31).

**Bachelor of Science in
Geology Curriculum**

GEO 1212, Physical Geology; GEO 1213, Physical Geology Lab; GEO 1222, Historical Geology; GEO 1223, Historical Geology Lab; GEO 1310, Descriptive Mineralogy; GEO 1311, Optical Crystallography; GEO 1308, Petrology; GEO 1418, Structural Geology; GEO 1440, Geomorphology; and eight geology electives.

MTH 1107, Functions and Basic Calculus and MTH 1108, Calculus *or* MTH 1123, MTH 1124, and MTH 1125, Calculus 1, 2, and 3; PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3; CHM 1111, CHM 1122, General Chemistry 1 and 2; CHM 1221, Analytical Chemistry *or* GEO 1412, Geochemistry; and two approved additional science electives.

In addition, complete the arts and sciences core curriculum (see page 31).

**Minor in Geology
Curriculum**

GEO 1212, Physical Geology; GEO 1222, Historical Geology; GEO 1308, Petrology; GEO 1213, Physical Geology Lab; GEO 1223, Historical Geology Lab; plus four geology electives (GEO 1250 or higher number) chosen with the approval of the geology department.

**Bachelor of Arts in
Environmental Geology
Curriculum**

GEO 1212, Physical Geology; GEO 1213, Physical Geology Lab; GEO 1222, Historical Geology; GEO 1223, Historical Geology Lab; GEO 1308, Petrology; GEO 1440, Geomorphology; GEO 1438, Geology and Land-use Planning; and five geology electives.

MTH 1107, Functions and Basic Calculus and MTH 1108, Calculus *or* MTH 1106, Fundamentals of Mathematics and MTH 1107, Functions and Basic Calculus; BIO 1103, BIO 1104, Principles of Biology 1 and 2; CHM 1111, CHM 1122, General Chemistry 1 and 2.

In addition, complete the arts and sciences core curriculum (see page 31).

**Bachelor of Science in
Environmental Geology
Curriculum**

GEO 1212, Physical Geology; GEO 1213, Physical Geology Lab; GEO 1222, Historical Geology; GEO 1223, Historical Geology Lab; GEO 1308, Petrology; GEO 1310, Descriptive Mineralogy; GEO 1440, Geomorphology; GEO 1438, Geology and Land-Use Planning; GEO 1442, Water in Environmental Planning; and eight geology electives.

MTH 1107, Functions and Basic Calculus; MTH 1108, Calculus; PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3 *or* BIO 1103, BIO 1104, BIO 1105, Principles of Biology 1, 2, and 3; CHM 1111, CHM 1122, General Chemistry 1 and 2; and CHM 1221, Analytical Chemistry *or* GEO 1412, Geochemistry; and two approved additional science electives.

In addition, complete the arts and sciences core curriculum (see page 31).

**Minor in Environmental
Geology Curriculum**

GEO 1212, Physical Geology *or* GEO 1140, Environmental Geology; GEO 1213, Physical Geology Lab; GEO 1222, Historical Geology; GEO 1223, Historical Geology Lab; GEO 1438, Geology and Land-Use Planning; plus four geology electives (GEO 1250 or higher number) chosen with the approval of the geology department.

History

William M. Fowler, Jr., PhD, *Professor and Chair*

Professors

Philip N. Backstrom, PhD
Ballard C. Campbell, PhD
Donald M. Jacobs, PhD
Patrick Manning, PhD
Anthony N. Perna, DA
Raymond H. Robinson, PhD

Associate Professors

Charmarie J. Blaisdell, PhD
Laura L. Frader, PhD
Harvey Green, PhD
Clay McShane, PhD

Assistant Professors

Christina Gilmartin, PhD
Gerald H. Herman, MA
Felix V. Matos Rodriguez, MA

A major in history, which examines humanity's diverse and complex past, provides students with an excellent opportunity to develop a greater understanding and appreciation of today's cultures and civilizations.

The department offers two degree programs: a Bachelor of Arts, for students preparing for graduate work in history or for teaching careers; and the Bachelor of Science, designed for students planning careers in public history fields or in the "new history" areas that require technical understanding of the social sciences.

All history majors are required to take courses in Western or world civilization, American history, and historical methodology, as well as a range of history electives that explore diverse periods and locales. Students finish the major with a seminar in Approaches to History, in which they complete a substantial research project that demonstrates both substantive and methodological expertise. Eligible students are encouraged to test themselves by doing an honors thesis. Students also have the opportunity, through directed study, to work on an individual basis with senior faculty on topics of mutual interest.

The major also provides students with opportunities to work as historians-in-training in diverse settings through cooperative education placements, fieldwork, internships, and other experiential learning activities. Students who use the major as a broad-based preparation for careers in business, law, journalism, or government have opportunities for relevant cooperative education experiences in the business and professional worlds.

Many history majors want to work directly in their field of study. Those who plan to teach in public school may combine history with education courses that can lead to state certification; those who plan to teach in private secondary schools need not be certified by state authorities. Teaching positions in colleges and universities require master's and doctoral degrees.

Many professional historians teach and write; others work in public archives, private historical societies, museums, government agencies, media, and restoration projects.

Bachelor of Arts Curriculum

HST 1101, Western Civilization to 1648 *or* HST 1121, World Civilization to 1648; *or* HST 1701, Western Civilization 1 (Honors); HST 1122, World Civilization since 1648 *or* HST 1102, Western Civilization since 1648 *or* HST 1702, Western Civilization 2 (Honors); HST 1201, The United States to 1877 *or* HST 1711, The United States to 1877 (Honors), and HST 1202, The United States since 1877 *or* HST 1712, The United States since 1877 (Honors); HST 1241, The Historian's Craft; HST 1805, Approaches to History; nine history electives distributed as follows: two courses in Group A (ancient, medieval, and early modern Europe); two courses in Group B (modern Europe); two courses in Group C (America); two courses in Group D (other regions); and one course in any of the above groups.

In addition, complete the arts and sciences core curriculum (see page 31).

Bachelor of Science Curriculum

HST 1101, Western Civilization to 1648 *or* HST 1121, World Civilization to 1648 *or* HST 1701, Western Civilization 1 (Honors); HST 1122, World Civilization since 1648 *or* HST 1702, Western Civilization 2 (Honors); HST 1102, Western Civilization since 1648; HST 1201 *or* HST 1711, The United States to 1877 (Honors); and HST 1202, The United States since 1877 *or* HST 1712, The United States since 1877 (Honors); HST 1241, The Historian's Craft; HST 1805, Approaches to History; eleven history electives distributed as follows: two courses in Group A (ancient, medieval, and early modern Europe); two courses in Group B (modern Europe); two courses in Group C (America); two courses in Group D (other regions); and three courses in any of the above groups.

A minor approved by the student's adviser; a statistics course (for example, PSY 1211, SOC 1320, or ECN 1250); and a computer course, preferably COM 1105.

In addition, complete the arts and sciences core curriculum (see page 31).

Minor Curriculum

Eight courses in history, two of which must be selected from the following: HST 1101, Western Civilization to 1648 *or* HST 1121, World Civilization to 1648 *or* HST 1701, Western Civilization 1 (Honors); HST 1102, Western Civilization since 1648 *or* HST 1122, World Civilization since 1648 *or* HST 1702, Western Civilization 2 (Honors); HST 1201, The United States to 1877 *or* HST 1711, The United States to 1877 (Honors); and HST 1202, The United States since 1877 *or* HST 1712, The United States since 1877 (Honors).

Human Services

Barbara A. Schram, EdD, *Director and Associate Professor, Education*

Advisory Committee

Patricia Fetter, PhD

Terry Haywoode, PhD
Education

Wilfred E. Holton, PhD
Sociology/Anthropology

Louise LaFontaine, EdD

Lawrence Litwack, EdD
*Counseling Psychology,
Rehabilitation, and
Special Education*

Gordana Rabrenovic, PhD

Sociology/Anthropology

David A. Rochefort, PhD
Political Science

Martha Wengert, MEd
Cooperative Education

Harold S. Zamansky, PhD
Psychology

Professor Emeritus

John D. Herzog, PhD

Human Services is an interdisciplinary major that combines psychology, sociology, education, political science, counseling, and other fields. Students take basic foundation courses, select specialization areas of their choice, and complete fieldwork internships in Boston area agencies. The major may lead to careers in the helping professions or to graduate programs in social work, counseling, rehabilitation, and law. Students who major in human services select specialization areas such as deaf studies, counseling, gerontology, adolescent issues, human services administration, drug and alcohol services, early childhood issues, special needs, and many more. Students prepare for positions in both public and private agencies including: casework in social service and welfare agencies; therapeutic treatment in mental health settings; rehabilitation counseling; parole and court outreach work in programs for delinquent youth; staff work in halfway houses, drug treatment institutions, and penal institutions; community organizing; services for the aging at home and in institutions; administration in human services agencies; evaluation and grant writing for social programs; and counseling and support for deaf clients through fluency in American Sign Language. Students in the major have special opportunities to participate in the Human Services Student Organization, in the Fenway Project, which provides student volunteers to community agencies, and Alpha Delta Omega, the national honor society in Human Services.

Bachelor of Arts Curriculum

Prerequisite courses. SOC 1100, Introduction to Sociology *or* ED 1100, Education and Social Science; ED 1302, Human Services Professions; PSY 1111, PSY 1112, Foundations of Psychology 1 and 2 *or* ED 1102, ED 1103, Human Development and Learning 1 and 2; POL 1111, Introduction to American Government *or* other basic political science course; ECN 1115, Principles of Macroeconomics *or* ECN 1116, Principles of Microeconomics *or* other basic economics course.

Core courses. PSY 1211, Statistics in Behavioral Science 1 *or* SOC 1320, Introduction to Statistical Analysis *or* ED 1307, Introduction to Educational Statistics; PSY 1511, Experimental Design in Psychology *or* SOC 1321, Research Methods 1 *or* SOC 1324, Human Services Research and Evaluation; SOC 1240, Sociology of Human Services Organizations; PSY 1272, Personality 1; PSY 1373, Abnormal Psychology 1; CRS 1314, Introduction to Counseling; SPC 1338, Group Discussion *or* SPC 1330, Interpersonal Communication 1; ED 1309, Intervention Strategies; INT 1333, Senior Seminar.

Fieldwork. INT 1336, INT 1337, Field Experience in Human Services 1 and 2.

Additional courses. Three courses focused on social and community issues such as poverty and welfare, minority affairs, or special needs populations, chosen with the student's academic adviser; and five courses in a particular specialization within human services, chosen with the student's academic adviser.

In addition, complete the arts and sciences bachelor of arts core curriculum (see page 31).

Bachelor of Science Curriculum

Prerequisite courses. Same as for the Bachelor of Arts curriculum.

Core courses. Same as for the Bachelor of Arts curriculum plus POL 1329, American Social Welfare Policy *or* SOC 1501, Social Policy and Social Intervention.

Additional courses. Three courses focused on social and community issues such as poverty and welfare, minority affairs, or special needs populations, chosen with the student's academic adviser; a six-course specialization with human services, chosen with the student's academic adviser; ED 1107, Beginning Computer Use *or* COM 1105, Computer Science and Its Applications.

In addition, complete the arts and sciences bachelor of science core curriculum (see page 31), plus another mathematics or science course.

Specialization in Deaf Studies

Prerequisite, core and fieldwork courses as listed above. ASL 1101, ASL 1102, American Sign Language 1 and 2; ASL 1201, ASL 1202, Intermediate Sign Language 1 and 2; and one of the following: ASL 1211, Deaf Culture; ASL 1212, Deaf History; PSY 1363, American Sign Language Linguistics; or ASL 1401, American Sign Language Literature.

Major in Human Services Combined with Elementary Education Program

Students can now major in Human Services and prepare themselves as beginning teachers at the elementary level, meeting the new requirements in Massachusetts. This program gives students a strong background in psychology, sociology, human services, and other fields of study along with skills in teaching. See a Human Services adviser or the chair of the Department of Education for the requirements of the double major.

Minor in Human Services Curriculum

ED 1302, Human Services Professions; ED 1309, Intervention Strategies; INT 1336, Field Experience in Human Services 1; SOC 1240, Sociology of Human Services Organizations; and two human services specialization courses approved by a human services adviser.

Journalism

Nicholas Daniloff, MA, *Associate Professor and Director*

Associate Professor

William Kirtz, MS

Assistant Professors

Jerome M. Berger, MS

Kelley C. Chunn, MS

Charles F. Fountain, MS

James Ross, MS

Linda Conway Tompkins, MA

The School of Journalism prepares students for careers in news media and related fields. The skills it emphasizes—writing, editing, information gathering, photojournalism, and design and graphics—also have broad applications in numerous other disciplines.

The school offers four undergraduate concentrations: advertising, newspaper/print media, public relations, and radio/television news. Students may enroll in either a five-year cooperative education program or a four-year program without co-op. The school strongly advises students to obtain cooperative education experience.

The New England Press Association (NEPA), representing 350 newspaper publishers, maintains its office on the Northeastern campus. Students have the opportunity to attend seminars and conferences sponsored by NEPA and other organizations.

The school seeks to contribute to the existing body of knowledge in journalism and mass communications in areas that help news media practitioners and educators perform their jobs with increasing effectiveness. To that end the school sponsors professional workshops and seminars in cooperation with media and related agencies.

Graduates work for some of the world's best newspapers, radio and television stations, wire services, general and specialized magazines, public relations departments, and advertising agencies.

Bachelor of Arts and Bachelor of Science Curriculum

Each major will complete the journalism core and one of four concentrations.

JRN 1103, JRN 1104, Newswriting 1 and 2; JRN 1206, Editing; JRN 1250, Interpreting the Day's News; JRN 1301, Basic Photojournalism; JRN 1501, History of Journalism; JRN 1508, Law of the Press; and JRN 1512, Journalism Ethics and Issues.

Concentration in advertising. JRN 1350, Advertising Principles; JRN 1440, Design and Graphics; JRN 1451, Advertising Copy Writing; JRN 1552, Advertising Practice; and one journalism elective.

Concentration in newspaper/print media. JRN 1305, Techniques of Journalism; JRN 1432, Local Government Reporting; JRN 1440, Design and Graphics; JRN 1575, Publication Production and Management; and one journalism elective.

Concentration in public relations. JRN 1336, Public Relations Principles; JRN 1440, Design and Graphics; JRN 1460, Public Relations Problems; JRN 1561, Public Relations Practice; and one journalism elective.

Concentration in radio/television news. JRN 1320, Radio News Gathering and Writing; JRN 1421, Television Newswriting; JRN 1422, Television News Production; JRN 1890, Directed Study; and one journalism elective.

Additional requirements. ENG 1275, Grammar for Journalists; ENG 1110, ENG 1111, Freshman English 1 and 2. One course from this list: ENG 1120, Survey of English Literature 1; ENG 1121, Survey of English Literature 2; ENG 1123, Survey of American Literature 1; ENG 1124, Survey of American Literature 2; and one additional English or American literature elective. POL 1310, American Ideology; POL 1318, State and Local Government; HST 1201, United States to 1877; HST 1202, United States since 1877; ECN 1115, Principles of Macroeconomics; and one additional

course in economics or business; MTH 1152, Statistical Thinking; PHL 1200, Introduction to Logic 1; PHL 1140, Social and Political Philosophy; two history electives; and COP 1135, Professional Development for Journalists. MUS 1109, Introduction to Art, Drama, and Music *or* one course from both of the following categories: (a) ART 1106, Introduction to Art; ART 1220, American Art; (b) MUS 1100, Introduction to Music; MUS 1101, Music as a Listening Experience.

Additional requirements for bachelor of arts. Three courses in science and/or math.

Additional requirements for bachelor of science. Two foreign language courses (at least up to Elementary II level) and four science or computer science courses. Two of the four science courses must be in biology, chemistry, and physics, and at least one of the science courses must be above the elementary level.

Students must also complete the arts and sciences core curriculum (see page 31).

Linguistics

Janet H. Randall, PhD, *Associate Professor, Linguistics and Coordinator of Linguistics Program*

Professors

Irene R. Fairley, PhD

English

Harlan Lane, PhD, Doc. ès

Lettres

Psychology

Joanne L. Miller, PhD

Psychology

Associate Professors

John N. Frampton, PhD

Mathematics

Michael R. Lipton, PhD

Philosophy and Religion

Marina McIntyre, PhD

Linguistics

Lynn M. Stephen, PhD

Anthropology

Assistant Professor

Neal Pearlmuter, PhD

Psychology

Linguistics—the science of language—focuses on such issues as how children learn to speak, how we understand and produce language, and how language ties people together. The field also explores how language is structured and represented in the mind, why some people are better than others at acquiring a second language, how sign languages differ from spoken languages, and how language variation and diversity affect education.

Seven departments (African-American Studies, American Sign Language, English, Modern Languages, Philosophy and Religion, Psychology, and Sociology/Anthropology) collaborate to offer a comprehensive Linguistics Program. The courses that each department offers in the program are identifiable by their cross-listed number in the course descriptions section of this book.

Almost all the linguistics courses have been approved for the honors program, and many of the majors and minors are honors program students.

Linguistics students have interesting co-op and foreign study opportunities. Several students have taken advantage of international co-op and study abroad, including an internship program at the Max Planck Institute for Psycholinguistics in the Netherlands. Many students have taken co-ops as research assistants to linguistic scholars, especially in Northeastern's own psycholinguistics laboratories.

Students with backgrounds in linguistics have pursued advanced degrees in fields including law, cognitive science, education, English, interpreting, business, speech pathology, computer science, and linguistics itself. Other graduates have gone on to work in research, translation, special-education, business, computer science, and law.

Bachelor of Arts and Bachelor of Science Curriculum

LIN 1118, Introduction to Language and Linguistics 1; LIN 1215, Symbolic Logic; LIN 1218, Introduction to Language and Linguistics 2; LIN 1220, Introduction to Phonetics and Phonology; LIN 1262, Psychology of Language; LIN 1335, Language and Culture; and LIN 1401, Introduction to Syntax.

Second language requirement. Proficiency through Intermediate 2 level plus two advanced courses. The college language placement procedures determine proficiency in a second language.

Additional courses. Four from the following (and other related courses by permission): LIN 1119, History of the English Language; LIN 1231, African-American English; LIN 1235, Applied Linguistics; LIN 1236, Advanced Applied Linguistics; LIN 1240, Bilingualism; LIN 1245, History of the French Language; LIN 1250, Linguistics of American Sign Language; LIN 1255, History of the Spanish Language; LIN 1260, Introduction to Romance Linguistics; LIN 1263, Nonverbal Communication; LIN 1362, Child Language; LIN 1364, Cognition; LIN 1365, Language and the Brain; LIN 1407, Semantics; LIN 1408, Topics in Linguistics; LIN 1415, African Languages; LIN 1440, Philosophy of Language; and LIN 1564, Laboratory in Cognition.

Lab course. LIN 1562, Laboratory in Psycholinguistics.

Seminar courses. Two from the following: LIN 1661, Seminar in Psycholinguistics; LIN 1662, Seminar in Cognition; LIN 1692, Seminar in Linguistics, and LIN 1693, Seminar in Linguistics.

Practicum course (in fieldwork, interpreting, teaching, etc.). LIN 1804, Directed Study.

In addition, complete the arts and sciences core curriculum (see page 31).

Bachelor of Science Curriculum

Same as the Bachelor of Arts, except that American Sign Language can count toward the second language proficiency requirement.

In addition, complete the arts and sciences core curriculum (see page 31).

Minor Curriculum

A total of six courses is required. LIN 1118, Introduction to Language and Linguistics 1; and LIN 1218, Introduction to Language and Linguistics 2.

Plus one from the following: LIN 1220, Introduction to Phonetics and Phonology; LIN 1262, Psychology of Language; and LIN 1401, Introduction to Syntax.

Three courses, not already taken, from the following: LIN 1119, History of the English Language; LIN 1215, Symbolic Logic; LIN 1220, Introduction to Phonetics and Phonology; LIN 1231, African-American English; LIN 1235, Applied Linguistics; LIN 1236, Advanced Applied Linguistics; LIN 1240, Bilingualism; LIN 1245, History of the French Language; LIN 1250, Linguistics of American Sign Language; LIN 1255, History of the Spanish Language; LIN 1260, Introduction to Romance Linguistics; LIN 1262, Psychology of Language; LIN 1263, Nonverbal Communication; LIN 1335, Language and Culture; LIN 1362, Child Language; LIN 1364, Cognition; LIN 1365, Language and the Brain; LIN 1401, Introduction to Syntax; LIN 1407, Semantics; LIN 1408, Topics in Linguistics; LIN 1415, African Languages; LIN 1440, Philosophy of Language; LIN 1562, Laboratory in Psycholinguistics; LIN 1564, Laboratory in Cognition; LIN 1661, Seminar in Psycholinguistics; LIN 1662, Seminar in Cognition; LIN 1692, Seminar in Linguistics; LIN 1693, Seminar in Linguistics; and LIN 1804, Directed Study.

Mathematics

Richard D. Porter, PhD, *Professor and Chair*

Professors

Samuel J. Blank, PhD
Bohumil Cenk, ScD
Terence J. Gaffney, PhD
Alberto R. Galmarino, PhD
Maurice E. Gilmore, PhD
Mark Goresky, PhD
Arshag B. Hajian, PhD
Anthony Iarrobino, PhD
Venkatrama Lakshminibai, PhD
Marc N. Levine, PhD
Fred S. Roberts, PhD
Egon Schulte, PhD
Jayant M. Shah, PhD
Mikhail Shubin, PhD
Gabriel Stolzenberg, PhD
Chuu-Lian Terng, PhD
Andrei V. Zelevinsky, PhD

Associate Professors

Mark Bridger, PhD
Robert W. Case, PhD
Stanley J. Eigen, PhD
John N. Frampton, PhD
Eugene H. Gover, PhD
Samuel Gutmann, PhD
Solomon M. Jekel, PhD
Donald R. King, PhD
Nishan Krikorian, PhD
N. V. R. Mahadev, PhD
Robert C. McOwen, PhD
Mark B. Ramras, PhD
Martin Schwarz, PhD
Thomas O. Sherman, PhD
Alexandru I. Suciu, PhD
Gordana G. Todorov, PhD
Jerzy M. Weyman, PhD

Assistant Professors

Florin Avram, PhD
Christopher K. King, PhD
Alex Martsinkovsky, PhD
David Massey, PhD
Carla B. Oblas, MS
Samuel S. Stueckle, PhD

Lecturers

Jane E. Devoe, MS
Robert A. Lupi, MS
Peter J. Philliou, MS
Steven W. Olson, ME

Professors Emeriti

Holland C. Filgo, PhD
Jack Wurga, PhD

Mathematics has become the foundation and a rich source of methods for most scientific and technological research. Mathematicians possess the skill to analyze the crucial features of diverse problems and to apply rigorous techniques to solve them.

The Bachelor of Arts degree requires at least thirteen mathematics courses and three physics courses, in addition to the study of a foreign language; it is appropriate for students who wish a broader liberal arts education. The Bachelor of Science degree requires at least sixteen mathematics courses and three physics courses but no foreign language study; it is more specialized, and it is recommended for those strongly interested in mathematics and science. The department also offers a minor degree in mathematics.

The major programs provide flexibility with elective courses. Students may take advantage of a range of interdisciplinary programs and may join a major in mathematics with one in such fields as computer science, physics, engineering (six different majors), chemistry, biology and economics.

Strong students are accepted in the honors program, and have the option to enroll in honors sections of several of their mathematics courses. All math majors may benefit from co-op opportunities in the scientific business in Boston and elsewhere. Almost every job involves mathematically stimulating work that enables students to find out how math is used in the world around us.

The increasing use of computers in calculus and other mathematics courses gives students significant computer experience. The Mathematics Computer Center, completed in early 1993, is the nucleus of a "mathematical culture" that links students to applications via computer.

Students planning to teach secondary-school mathematics must major in mathematics and take a specific minor in education, which includes coursework and student teaching.

Mathematical training may lead to opportunities in applied research (natural sciences, engineering, economics, management, computer science) as well as in mathematical research, teaching, or industry.

Bachelor of Arts Curriculum

MTH 1140, MTH 1141, MTH 1142, Calculus 1, 2, and 3; MTH 1243, MTH 1244, Calculus 4 and 5; MTH 1245, MTH 1246, Differential Equations 1 and 2; MTH 1238, Combinatorial Mathematics; MTH 1301, Linear Algebra; MTH 1311, Analysis 1; and three approved mathematics electives selected in consultation with an adviser.

PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3.

In addition, complete the arts and sciences core curriculum (see page 31).

Bachelor of Science Curriculum

MTH 1140, MTH 1141, MTH 1142, Calculus 1, 2, and 3; MTH 1243, MTH 1244, Calculus 4 and 5; MTH 1245, MTH 1246, Differential Equations 1 and 2; MTH 1238, Combinatorial Mathematics; MTH 1301, Linear Algebra; MTH 1311, Analysis 1; and six approved mathematics electives selected in consultation with an adviser.

PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering 1, 2, and 3.

In addition, complete the arts and sciences core curriculum (see page 31).

Minor Curriculum

Eight MTH courses, of which the following four are required: three courses in calculus (MTH 1140, MTH 1141, MTH 1142, or equivalent); and MTH 1238, Combinatorial Mathematics. (MTH 1137 and MTH 1237 together are permitted to substitute for MTH 1238. If this option is elected, then nine courses are required for the minor.) The remaining four courses are selected with the assistance of a departmental adviser: a) two must be selected from MTH 1200 or higher courses, e.g., MTH 1225, MTH 1226, MTH 1230, or MTH 1384 (these two courses may be required by the student's major program); b) the other two must be selected from MTH 1301–1399 and may **not** be among those required by the student's major program (MTH 1384 cannot be counted by many engineering majors and MTH 1301 cannot be counted by computer science majors; MTH 1301 cannot be counted at all if MTH 1230 is already counted in "a," above).

Modern Languages

TBA, Chair

Professors

Inez Hedges, PhD
Constance H. Rose, PhD

Associate Professors

Lillian Bulwa, PhD
Walter M. Gershuny, PhD
Juliette M. Gilman, PhD
Neil A. Larsen, PhD
Bonnie S. McSorley, PhD
Holbrook C. Robinson, PhD
Stephen A. Sadow, PhD
John Spiegel, PhD

Assistant Professor

Robert B. Modee, MA

The study of modern languages can benefit all students, regardless of their majors. The multicultural world in which we live requires increased communication among varied and often divergent cultures. Learning a new language and its culture enables students to cross cultural barriers and to achieve a more cosmopolitan, open-minded, and sensitive view of the world.

The rationale behind all the majors in the department is the same: to ensure that students become as fluent as possible in a given language, and to introduce them to the relevant culture of that language. For this reason, the students take a number of language classes as well as literature, cinema, and general civilization courses. In addition, students are urged to consider participating in international co-op, which prepares students to function on an everyday level in a foreign country.

The major in modern languages is available in French and Spanish; it is also possible with special departmental permission to pursue a major in Italian, Russian, and German. Where possible, it is preferable to minor in Italian, Russian, or German, since smaller numbers of advanced courses are routinely offered by the department in these languages than in French and Spanish. The majors in French and Spanish are outlined below.

A major in a modern language can form the basis for careers in teaching at the elementary, secondary, or college level; international business relations; high-tech fields; government service; journalism; library science; world affairs; travel; and community service, especially in Spanish-speaking areas.

**Bachelor of Arts in
French Curriculum**

LNF 1201, Intensive Review of French; LNF 1202, LNF 1203, and LNF 1204, French Composition Conversation 2, 3, and 4; LNF 1512, Masterpieces of Modern European Fiction; LNF 1231 and LNF 1232, Masterpieces of French Literature 1 and 2; LNF 1225, Introduction to the French Speaking World; LNF 1309, LNF 1310, LNF 1311 and LNF 1312, French Literature of the Nineteenth through Twentieth Centuries; ENG 1118, Introduction to Linguistics; and LNL 1260, Introduction to Romance Linguistics. As an ancillary course, students are encouraged to take at least one elective pertaining to France.

**Bachelor of Arts in
Spanish Curriculum**

Group I: LNS 1203 and LNS 1204, Composition and Conversation 3 and 4. Group II (prerequisite LNS 1204): LNS 1231, LNS 1232, Masterpieces of Spanish Literature 1 and 2; LNS 1316, Latin American Literature 2. Group III: LNS 1500, Backgrounds of Spanish Culture or LNS 1501, Backgrounds of Latin American Culture. Group IV (prerequisites Groups I and II), take four: LNS 1301, Medieval Literature; LNS 1303, 15th and 16th Century Literature; LNS 1306, Golden Age Theater; LNS 1309, LNS 1310, 19th Century Literature 1 and 2; LNS 1311, LNS 1312, 20th Century Literature 1 and 2; LNS 1315, Latin American Literature 1; LNS 1506, Cervantes; LNS 1511, Caribbean Literature. Group V, open electives: LNL 1235, Applied Linguistics; LNL 1250, Introduction to Romance Linguistics; LNS 1260, History of the Spanish Language; LNS 1400, Spanish Seminar (topic varies); LNS 1510, Saints and Sinners; LNS 1512, Don Juan; LNS 1550 Spanish Civil Wars in Spanish Film. Ancillary courses: Two courses from the social sciences pertaining to Latin America, Latino Studies or Europe and one course in linguistic reasoning.

Minor Curriculum

Six advanced courses (above 104 level); two courses in composition and conversation; one of the Masterpieces of Literature series (1231, 1232); one culture course; and two electives.

Since the German, Italian, and Russian sections of the department have limited course offerings, students are advised to begin their study of these languages as early as possible, and to coordinate carefully their programs with their language adviser.

Music

David D. Sonnenschein, DMA, *Associate Professor and Chair*

Professors

Joshua R. Jacobson, DMA
Roland L. Nadeau, MM
Judith Tick, PhD

Associate Professors

William Lowe, MA
Dennis H. Miller, DMA
Bruce Ronkin, DMA

Assistant Professors

Susan Asai, PhD
Leonard L. Brown, PhD

Lecturers

Marjorie J. Atlas, MM
Paul Beadoin, MM
Cornelia E. Boniface, MBA
Douglas F. Durant, PhD

Virginia Eskin, BA
Allen G. Feinstein, MM
Leon C. Janikian, MM
Michael Manning, MM
Karen L. Pokross, EdM
Andrew J. Rega, BM
Jeanne M. Segal, MM
Robert Ward, MM

The music department approaches the study and performance of music from a global perspective. The multicultural treatment of the musical arts expands on Western civilization's achievements and affirms that the music of other civilizations, with different musical traditions, is equally worthy of performance and serious study.

The department offers three concentrations in the context of a broad liberal arts program. The music industry concentration is the first such undergraduate program in Boston. It is designed for students with an interest in artist management, marketing and promotion, contracting and legal issues, the recording process, and studio techniques. Developed in collaboration with Northeastern's College of Business Administration, the music industry concentration leads to a Bachelor of Science degree.

The two other concentrations lead to Bachelor of Arts degrees. The music literature concentration has a historical orientation, while the program in music literature and performance combines history with hands-on music making. Students must audition for the music literature and performance program. This program may be especially useful for students working toward a Massachusetts teaching certification, which now requires a dual major in education and another liberal arts program.

Through an exchange program, students may attend classes at the New England Conservatory of Music. Students also share an array of high-tech and multimedia equipment.

While some music courses are designed for music majors, the department also offers elective survey courses. Several of these courses fulfill the College of Arts and Sciences core curriculum requirement.

An extensive concert series offers a variety of performances by students, faculty, and guest artists. Students also have the opportunity to participate in our active choral groups, bands, and chamber ensembles.

Bachelor of Arts Curriculum

Concentration in music literature. MUS 1107, Principles of Music Literature; MUS 1200, Fundamentals of Theory; MUS 1201, MUS 1202, MUS 1203, MUS 1204, Music Theory 1, 2, 3, and 4; MUS 1241, Piano 1; either MUS 1301, MUS 1302, Form and Analysis 1 and 2; *or* MUS 1211, Sight Singing and MUS 1250, Conducting; MUS 1171, Computer Literacy for Musicians; MUS 1421, MUS 1422, MUS 1423, MUS 1424, and MUS 1425, Historical Traditions 1, 2, 3, 4, and 5. Also take HST 1102, Western Civilization 2.

In addition, complete the arts and sciences core curriculum (see page 31).

Concentration in music literature and performance. MUS 1107, Principles of Music Literature; MUS 1200, Fundamentals of Theory; MUS 1201, MUS 1202, MUS 1203, MUS 1204, Music Theory 1, 2, 3, and 4; MUS 1241, Piano 1; either MUS 1301 and 1302, Form and Analysis 1 and 2; *or* MUS 1211, Sight Singing and MUS 1250, Conducting; MUS 1461, Applied Music Lessons (taken six times); MUS 1171, Computer Literacy for Musicians; MUS 1421, MUS 1422, MUS 1423, MUS 1424, and MUS 1425, Historical Traditions 1, 2, 3, 4, and 5. Also take HST 1102, Western Civilization 2.

Students preparing for the Massachusetts Music Teaching Provisional Certification have to add the following courses: ED 1306, Measurement and Evaluation; ED 1412, Fundamentals of Curriculum Development; (NEC) Music Education Orientation; (NEC) ED 413, Teaching Choral Music; (NEC) ED 417, Teaching Instrumental Music; (NEC) ED 332, Teaching Classroom Music II; (NEC) ED 533, Philosophy of Music Education; (NEC) ED 461, Practice Teaching Seminar; and (NEC) ED 463, Practice Teaching.

Students in both concentrations must participate in at least one Northeastern University performing ensemble during at least eight of their quarters on campus.

In addition, complete the arts and sciences core curriculum (see page 31).

Bachelor of Science Curriculum

Concentration in music industry. MUS 1107, Principles of Music Literature; MUS 1200, Fundamentals of Theory; MUS 1201, MUS 1202, MUS 1203, Music Theory 1, 2, and 3; MUS 1241, Piano 1; MUS 1171, Computer Literacy for Musicians; MUS 1421 and MUS 1425, Historical Traditions 1 and 5; any two of the following: MUS 1422, MUS 1423, MUS 1424, Historical Traditions 2, 3, and 4; MUS 1165 and MUS 1166, Music Industry 1 and 2; MUS 1365, Seminar in the Music Industry. Choose five music industry electives from: MUS 1167, Music Administration; MUS 1172, The Recording Studio; MUS 1173, The Recording Studio 2; MUS 1360, Artist Management; MUS 1366, Copyright Law for the Musician; MUS 1367, Computer Applications in Music Business. Additional electives are planned.

ECN 1115, Principles of Macroeconomics; ECN 1116, Principles of Microeconomics. One of the following three pairs of courses in descriptive and inferential statistics: MTH 1387 and 1390; ECN 1250 and 1251; POL 1301 and 1302. MGT 1115, Introduction to Business; ACC 1111, Introduction to Accounting. Two of the following business courses: FIN 1438, Introduction to Finance; MKT 1435, Introduction to Marketing; HRM 1432, Organizational Behavior; MSC 1441, Operations Management; ENT 1330, Management of Smaller Enterprises; HST 1102, Western Civilization 2.

Students must participate in at least one Northeastern University performing ensemble during at least four of their quarters on campus.

In addition, complete the arts and sciences core curriculum (see page 31).

Music teacher program. The Music department at Northeastern University and the New England Conservatory of Music have launched a coordinated Music Teacher Preparation Program. This comprehensive program, designed to meet the new Massachusetts state certification requirements, will prepare students for the music teaching profession. In accordance with the new state certification requirements, music teachers must earn a BA in music for provisional certification and a master's degree for standard certification. This new undergraduate program is a synthesis of Northeastern University's existing Music Literature and Performance major and a battery of New England Conservatory of Music Education courses as well as practice teaching (practicum). This program will lead to a Northeastern University BA degree in music with Massachusetts teacher certification (recognized by most states). Because enrollments are limited, the program should be considered to be competitive. For additional information and audition requirements for the BA in music, contact: Professor David Sonnenschein, Chair, Music Department, 351 Ryder Hall, 360 Huntington Avenue, Boston, MA 02115.

Minor Curriculum

General music track. MUS 1200, Fundamentals of Music; MUS 1201, Music Theory 1; MUS 1202, Music Theory 2; MUS 1241, Piano 1 *or* MUS 1209, Functional Piano; MUS 1100, Introduction to Music *or* MUS 1107, Principles of Music; and a music history course.

Music theatre track. MUS 1200, Fundamentals of Music; MUS 1201, Music Theory 1; MUS 1100, Introduction to Music; MUS 1211, Sight Singing; MUS 1244, Voice Class 1; INT 1110, American

Musical Theatre *or* MUS 1132, Introduction to Opera; MUS 1100, Introduction to Music *or* MUS 1107, Principles of Music; and the following courses four times each: MUS 1261, Voice Lessons and MUS 1230, Chorus.

Music industry track. MUS 1200, Fundamentals of Music; MUS 1201, Music Theory 1; MUS 1165, Music Industry 1; MUS 1166, Music Industry 2; MUS 1241, Piano Class 1 *or* MUS 1209, Functional Piano; MUS 1100, Introduction to Music *or* MUS 1107, Principles of Music; MUS 1170, Music and Technology *or* MUS 1171, Computer Literacy for Musicians; and two approved music industry electives.

Philosophy and Religion

Susan M. Setta, PhD, *Associate Professor and Chair*

Professors

Walter L. Fogg, PhD
Stephen L. Nathanson, PhD

Associate Professors

William J. DeAngelis, PhD
Michael Lipton, PhD
Gordon E. Pruett, PhD

Lecturer

Margaret C. Huff
Michael C. Meyer, PhD

Philosophy addresses questions and theories related to art, religion, morality, society, and natural and social sciences. The study of philosophy challenges students to examine through critical reflection their beliefs in many areas.

Courses aim to provide students with an understanding of the methods and traditions of philosophical and religious thought. Through readings, discussion, and writing, students examine questions concerning the nature and validity of religious beliefs, moral judgments, and scientific theories as well as questions about values and social policy in such areas as law, medicine, and technology.

Coursework in philosophy can strengthen the student's work in other areas. Philosophy majors enter diverse careers, ranging from college-level teaching to law. The program strives to help students sharpen their critical abilities, thereby enhancing their preparation for graduate or professional study.

PHL 1200, Introduction to Logic 1; PHL 1225, Ancient Philosophy; PHL 1230, History of Modern Philosophy; PHL 1400, Theory of Knowledge *or* PHL 1405, Metaphysics *or* PHL 1335, Moral Philosophy; PHL 1290, Cults and Sects *or* PHL 1345, Philosophy of Religion; three of the following: PHL 1100, Introduction to Religion; PHL 1275, Eastern Religions; PHL 1280, Islam; PHL 1315, Understanding *The Bible*; and five philosophy and religion electives to bring the total number of quarter hours in the major to fifty-two.

In addition, complete the arts and sciences core curriculum (see page 31).

PHL 1100, Introduction to Philosophy 1 *or* PHL 1105, Introduction to Scientific Method; PHL 1225, Ancient Philosophy *or* PHL 1230, History of Modern Philosophy; PHL 1200, Introduction to Logic 1 *or* PHL 1215, Symbolic Logic; one of the following: PHL 1142, Philosophy of Mind; PHL 1400, Theory of Knowledge; PHL 1405, Metaphysics; and PHL 1335, Moral Philosophy; and three philosophy electives.

Concentration in religious studies. Designed for philosophy majors seeking a career in religious studies, this concentration focuses on providing competency in comparative religion, textual analysis, and methodology. Through the concentration in religious studies, the students will understand the basic theologies, practices, and ethical system of several of the world's larger faith traditions.

Physics

Paul M. Champion, PhD, *Professor and Chair*

Professors

Ronald Aaron, PhD
Petros N. Argyres, PhD
Arun Bansil, PhD
Alan H. Cromer, PhD
David A. Garelick, PhD
Haim Goldberg, PhD
Jorge V. José, PhD
Robert P. Lowndes, PhD
Robert S. Markiewicz, PhD
Pran Nath, PhD
Clive H. Perry, PhD
Stephen Reucroft, PhD

Carl A. Shiffman, PhD
Jeffrey B. Sokoloff, PhD
Yogendra N. Srivastava, PhD
Michael T. Vaughn, PhD
Eberhard von Goeler, PhD
Allan Widom, PhD
Fa Yueh Wu, PhD

Associate Professors

George O. Alverson, PhD
Jacqueline Krim, PhD
Marie E. Machacek, PhD
Srinivas Sridhar, PhD

Assistant Professors

Nathan Israeloff, PhD
Alain S. Karma, PhD
J. Timothy Sage, PhD
John D. Swain, PhD
Tomasz Taylor, PhD

Professors Emeriti

William L. Faissler, PhD
Marvin H. Friedman, PhD
Michael J. Glaubman, PhD
Walter Hauser, PhD
Bertram J. Malenka, PhD
Eugene J. Saletan, PhD

Physics examines the fundamental principles that govern natural phenomena, ranging in scale from collisions of subatomic particles, through the behavior of solids, liquids, and biomolecules, to exploding stars and colliding galaxies.

Bachelor of Arts and Bachelor of Science Curriculum

Minor Curriculum

The program aims to help students experience the intellectual stimulation of studying physics and astrophysics and the excitement of front-line research; understand the basic principles and techniques of physics-related careers; and prepare for graduate study in physics or related fields.

The department offers four levels of undergraduate courses: descriptive courses for non-science majors with limited mathematical background; general survey courses for students in scientific and engineering fields; advanced courses primarily intended for physics majors; and highly advanced courses primarily intended for prospective graduate students.

In addition to work in industrial, government, or high-technology laboratories in areas of applied physics, students may find opportunities in such fields as biophysics, computer science, geophysics, medical and radiation physics, and engineering. Many physics majors pursue advanced degrees in physics and related fields.

Bachelor of Arts Curriculum

PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3, and associated labs PHY 1521, PHY 1522, PHY 1533; PHY 1301, Intermediate Mechanics; PHY 1302, Electric and Magnetic Fields; three upper-level physics lecture courses, and three upper-level lab courses.

MTH 1140, MTH 1141, MTH 1142, Calculus 1, 2, and 3; MTH 1243, MTH 1244, Calculus 4 and 5; and one advanced mathematics elective.

In addition, complete the arts and sciences core curriculum (see page 31).

Bachelor of Science Curriculum

PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3, and associated labs PHY 1521, PHY 1522, PHY 1533; PHY 1301, Intermediate Mechanics; PHY 1302, Electric and Magnetic Fields; PHY 1303, Modern Physics; PHY 1304, Mathematical Physics; PHY 1305, Thermodynamics and Kinetic Theory; PHY 1401, Classical Mechanics; PHY 1402, PHY 1403, Electricity and Magnetism 1 and 2; PHY 1404, Wave Motion and Optics; and three upper-level lab courses.

MTH 1140, MTH 1141, MTH 1142, Calculus 1, 2, and 3; MTH 1243, MTH 1244, Calculus 4 and 5; MTH 1245, MTH 1246, Differential Equations 1 and 2; and five additional electives from those approved for majors in the following fields: physics, mathematics, computer science, chemistry, engineering, biology, and geology.

In addition, complete the arts and sciences core curriculum (see page 31).

Bachelor of Science in Applied Physics Curriculum

PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3, and associated labs; PHY 1521, PHY 1522, PHY 1533; PHY 1301, Intermediate Mechanics; PHY 1302, Electric and Magnetic Fields; PHY 1303, Modern Physics; PHY 1305, Thermodynamics and Kinetic Theory; PHY 1404, Wave Motion and Optics; PHY 1551 and PHY 1552, Electronics for Scientists 1 and 2; PHY 1555, Wave Lab; PHY 1557, Advanced Lab; and PHY 1561, Project Lab.

MTH 1140, MTH 1141, MTH 1142, Calculus 1, 2, and 3; MTH 1243, MTH 1244, Calculus 4 and 5; MTH 1245, MTH 1246, Differential Equations 1 and 2.

COM 1100, Fundamentals of Computer Science; COM 1101, Algorithms and Data Structures 1; and COM 1201, Data Structures 2. Four additional electives from those approved for majors in the following fields: physics, mathematics, chemistry, computer science, engineering, biology, and geology.

In addition, complete the arts and sciences core curriculum (see page 31).

Minor in Physics Curriculum

PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3, and three upper-level lecture or lab courses from the following list: PHY 1301, PHY 1302, PHY 1303, PHY 1304, PHY 1305, PHY 1401, PHY 1402, PHY 1403, PHY 1404, PHY 1411, PHY 1412, PHY 1413, PHY 1414, PHY 1415, PHY 1416, PHY 1551, PHY 1552, and PHY 1555.

Minor in Instrumentation for Science Curriculum

The minor offers experience in the use of common laboratory instruments, the taking and analysis of data, and elementary skills in electronics. A primary goal of the minor is to prepare the student to design and construct relatively small-scale purpose measurement instrumentation.

Required courses: PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3; PHY 1555, Wave Laboratory; and PHY 1551, PHY 1552, Electronics for Scientists 1 and 2.

Political Science

TBA, *Chair*

Professors

Michael A. Baer, PhD
Robert L. Cord, PhD
Robert E. Gilbert, PhD
Suzanne P. Ogden, PhD
David E. Schmitt, PhD

Distinguished Visiting Professor

Michael S. Dukakis, JD

Associate Professors

Christopher J. Bosso, PhD
L. Gerald Bursey, PhD
Minton F. Goldman, PhD
Eileen L. McDonagh, PhD
William F. S. Miles, PhD
John H. Portz, PhD
David A. Rochefort, PhD
Denis J. Sullivan, PhD

Assistant Professors

Leslie E. Armijo, PhD
William D. Kay, PhD
Richard A. Loverd, PhD
William G. Mayer, PhD
John F. Ross, PhD
Michael C. Tolley, PhD
Bruce A. Wallin, PhD

Undergraduates majoring in political science study political behavior, power, policies, values, and institutions. Students gain an awareness of the environment that shapes policies and a sensitivity to multicultural, gender, and racial issues implicit in policies, institutions, and values.

The department has concentrations in law and legal issues and in public administration and offers a range of courses on international relations, comparative politics, American politics, political philosophy, and public administration.

Approximately half the majors participate in the cooperative education program, with placements in state and federal government agencies, law firms, nonprofit institutions, and corporations. Most students complete either a co-op position or an internship with a congressional representative, a senator, a governor, or other elected public servant.

Students may also participate in extracurricular programs designed to expand their leadership ability, such as the Model United Nations, the Model Arab League, the student government, or the College Democrats or College Republicans. Many students study abroad in one of the college's international programs, such as the Irish Studies program, which includes an internship in the Irish Parliament. Qualified students may be selected for the honors program and join the activities of the political science honor society.

A major in political science helps prepare students for law school, graduate school, and careers in the government and the nonprofit sector, as well as for teaching, journalism, legislative or lobbying positions, public relations activities, and work in international corporations.

Bachelor of Arts Curriculum

POL 1110, Introduction to Politics; POL 1111, Introduction to American Government; POL 1112, Introduction to International Relations; POL 1113, Introduction to Foreign Governments and Societies; POL 1261, Public Administration; one political theory/thought course selected from the following: POL 1373, POL 1374 or POL 1378; and seven political science electives.

Six social science electives selected from at least three of the following areas: African-American studies, anthropology, economics, history, psychology (consult the political science department's approved psychology course list), and sociology.

In addition, complete the arts and sciences core curriculum (see page 31).

Concentration in law and legal issues. POL 1110, Introduction to Politics; POL 1111, Introduction to American Government; POL 1261, Public Administration; POL 1373, Pre-Modern Political Thought or POL 1374, Modern Political Thought or POL 1378, Contemporary Political Thought; six law-related political science electives; and four general political science electives.

Six social science electives selected from at least three of the following areas: African-American studies, anthropology, economics, history, psychology (consult the political science department's approved psychology course list), and sociology.

In addition, complete the arts and sciences core curriculum (see page 31).

Bachelor of Science Curriculum

POL 1110, Introduction to Politics; POL 1111, Introduction to American Government; POL 1112, Introduction to International Relations; POL 1113, Introduction to Foreign Governments and Societies; POL 1261, Public Administration; POL 1301, POL 1302, Research Methods 1 and 2; and one political theory/thought course selected from the following: POL 1370, POL 1373, POL 1374 or POL 1378; and six political science electives.

Six social science electives selected from at least three of the following areas: African-American studies, anthropology, economics, history, psychology (consult the political science department's approved psychology course list), and sociology.

In addition, complete the arts and sciences core curriculum (see page 31).

Concentration in law and legal issues. POL 1110, Introduction to Politics; POL 1111, Introduction to American Government; POL 1261, Public Administration; POL 1301, POL 1302,

Research Methods 1 and 2; POL 1373, Pre-Modern Political Thought *or* POL 1374, Modern Political Thought *or* POL 1378, Contemporary Political Thought; six law-related political science electives; and two general political science electives.

Six social science electives selected from at least three of the following areas: African-American studies, anthropology, economics, history, psychology (consult the political science department's approved psychology course list), and sociology.

In addition, complete the arts and sciences core curriculum (see page 31).

Concentration in public administration. POL 1110, Introduction to Politics; POL 1111, Introduction to American Government; POL 1261, Public Administration; POL 1301, POL 1302, Research Methods 1 and 2; POL 1373, Pre-Modern Political Thought *or* POL 1374, Modern Political Thought *or* POL 1378, Contemporary Political Thought; six public administration electives; and two general political science electives.

Six social science electives selected from at least three of the following areas: African-American studies, anthropology, economics, history, psychology (consult political science department's approved psychology course list), and sociology.

In addition, complete the arts and sciences core curriculum (see page 31).

Minor Curriculum

Any two of the following courses: POL 1110, Introduction to Politics; POL 1111, Introduction to American Government; POL 1112, Introduction to International Relations; POL 1113, Introduction to Foreign Governments and Societies; POL 1261, Public Administration. Any five additional courses offered by the Department of Political Science for political science majors, including courses listed above that have not been selected to fulfill the above requirement.

Minor in International Politics Curriculum

POL 1112, Introduction to International Relations; POL 1113, Introduction to Foreign Governments and Societies; any five additional courses in international politics and/or comparative politics offered by the Department of Political Science.

Psychology

James R. Stellar, PhD, *Professor and Chair*

Professors

Judith A. Hall, PhD
Stephen G. Harkins, PhD
Leon J. Kamin, PhD
Harlan L. Lane, PhD,
Doc. ès Lettres
Harry A. Mackay, PhD
Joanne L. Miller, PhD
Adam J. Reeves, PhD
Alexander A. Skavenski, PhD
Harold S. Zamansky, PhD

Associate Professors

Martin L. Block, PhD
Perrin S. Cohen, PhD
Rhea T. Eskew, PhD
Charles Karis, PhD

Assistant Professors

David J. Bryant, PhD
Jane A. Bybee, PhD
Elizabeth Cole, PhD
C. Randall Colvin, PhD
Denise Jackson, PhD
Frank Naarendorp, PhD
Neal Pearlmutter, PhD

Psychology is the study of human and animal behavior and the ways people think. An interdisciplinary science, psychology includes methods and knowledge derived from the other natural and social sciences.

The psychology curriculum explores such topics as how brain function determines behavior; how we see, hear, and learn; what constitutes abnormal personality; how people develop emotionally and cognitively; and how individuals work in groups. Through laboratory practice and experimentation, individual research projects, and small-group seminars, the program encourages critical evaluation of psychology's accomplishments and its future.

The Bachelor of Arts degree is intended for students who wish to pursue a broad liberal arts education that explores the humanities, the social sciences, and, to a lesser extent, the natural sciences. The Bachelor of Science degree is more specialized and is usually recommended for students who have a strong scientific interest in psychology and the natural sciences.

The psychology department offers honors sections of introductory psychology, as well as honors activities in other courses. All students are eligible for directed study courses, which are individualized study or research experiences under the supervision of a faculty member. Co-op placements are based in both community (often mental health) and laboratory settings.

A solid scientific background in psychology helps prepare students for careers in teaching, business, public service, or research and provides a foundation for graduate study in all areas of psychology, including clinical, as well as in law and medicine.

Bachelor of Arts and Bachelor of Science Curriculum

PSY 1110, Perspectives in Psychology 1 *or* PSY 1111, Foundations of Psychology 1; PSY 1112, Foundations of Psychology 2 *or* PSY 1113, Perspectives in Psychology 2; PSY 1211 and PSY 1212, Statistics in Behavioral Science 1 and 2. Students in PSY 1111 and PSY 1112 are normally required to participate as research subjects in experiments conducted by department faculty.

Two courses from the following: PSY 1271, Social Psychology; PSY 1272, Personality 1 or PSY 1373, Abnormal Psychology 1; and PSY 1241, Human Behavioral Development 1. Three courses from the following: PSY 1262, Psychology of Language or PSY 1364, Cognition; PSY 1231, Learning and Motivation; PSY 1351, Psychobiology; and PSY 1381, Sensation or PSY 1382, Perception.

Within the psychology department, students may concentrate their electives in a variety of subareas, including language and cognition; learning and motivation; personality and social psychology; sensory and psychobiology; or individual study. Students should see a department adviser regarding these concentrations.

Additional requirements for Bachelor of Arts: Four psychology electives; *either* three psychology labs or two psychology labs and one psychology directed study; one psychology seminar.

Additional requirements for Bachelor of Science: Seven psychology electives; *either* four psychology labs or three psychology labs and one psychology directed study; one psychology seminar. Four mathematics, science, or computer science courses beyond the core curriculum requirements. Also, one humanities course beyond the core curriculum requirements.

Students must also complete the arts and sciences core curriculum (see page 31).

Minor Curriculum

PSY 1110, Perspectives in Psychology 1 or PSY 1111, Foundations of Psychology 1; PSY 1112, Foundations of Psychology 2 or PSY 1113, Perspectives in Psychology 2; and PSY 1211, PSY 1212, Statistics in Behavioral Science 1 and 2.

Two courses from the following: PSY 1271, Social Psychology; PSY 1272, Personality 1 or PSY 1373, Abnormal Psychology 1; PSY 1241, Human Behavioral Development 1; PSY 1262, Psychology of Language or PSY 1364, Cognition; PSY 1231, Learning and Motivation; PSY 1351, Psychobiology; and PSY 1381, Sensation or PSY 1382, Perception.

Four psychology electives.

Sociology and Anthropology

T. Anthony Jones, PhD, *Associate Professor and Chair*

Professors

Arnold Arluke, PhD
Winifred Breines, PhD
Michael E. Brown, PhD
Morris Freilich, PhD
Christine Gailey, PhD
Debra R. Kaufman, PhD
Alan M. Klein, PhD
Elliott A. Krause, PhD
Jack Levin, PhD
Ronald J. McAllister, PhD
Felix M. Padilla, PhD
Earl Rubington, PhD

Associate Professors

Michael Blim, PhD
Richard Bourne, PhD
Luis M. Falcon, PhD
Wilfred E. Holton, PhD
Maureen Kelleher, PhD
Thomas H. Koenig, PhD
Carol A. Owen, PhD
Judith Perrolle, PhD
Thomas M. Shapiro, PhD
Lynn Stephen, PhD

Assistant Professors

Daniel R. Faber, PhD
Gordana Rabrenovic, PhD

Professor Emeritus

Morton Rubin, PhD

Sociology and anthropology provide the critical perspective needed for studying the social arrangements in which people live, in particular for understanding how societies function, for studying the conditions under which people change society, and for describing the modes and conditions of cooperation that make social life possible.

Courses in the program examine such areas as gender, race, class, cities, conflict, law and crime, multiculturalism and intercultural relations, technology and the environment, education, media, and the comparative interdisciplinary analyses of societies. Many courses are directly relevant to majors in other fields, including economics, political science, philosophy, literature, criminal justice, and business.

A major in sociology or anthropology helps prepare students for careers in public or private service, including such fields as law, teaching, social work, administration or management, and research.

SOC 1100, Introduction to Sociology; SOA 1100, Peoples and Cultures; SOC 1320, Introduction to Statistical Analysis; SOC 1321, SOC 1322, Research Methods 1 and 2; SOC 1300, Classical Social Thought; SOC 1301, Current Social Thought; SOC 1310, Class, Power, and Social Change; two intermediate courses (1100 or 1200 level); two advanced courses (1300, 1400, or 1500 level); and one anthropology course beyond SOA 1100. Six electives in the social sciences other than sociology/anthropology.

In addition, complete the arts and sciences core curriculum (see page 31).

Bachelor of Arts in Sociology Curriculum

**Bachelor of Science in
Sociology Curriculum**

SOC 1100, Introduction to Sociology; SOA 1100, Peoples and Cultures; SOC 1320, Introduction to Statistical Analysis; SOC 1321, SOC 1322, Research Methods 1 and 2; SOC 1300, Classical Social Thought; SOC 1301, Current Social Thought; SOC 1310, Class, Power, and Social Change; two intermediate courses (1100 or 1200 level); two advanced courses (1300, 1400, or 1500 level); and one anthropology course beyond SOA 1100. Six electives in the social sciences other than sociology/anthropology. Six additional electives.

In addition, complete the arts and sciences core curriculum (see page 31).

**Minor in Sociology
Curriculum**

SOC 1100, Introduction to Sociology; any two courses from among the following: SOC 1321, Research Methods 1; SOC 1322, Research Methods 2; SOC 1300, Classical Social Thought; SOC 1301, Current Social Thought; any three-course specialization in sociology arranged between the student and adviser; and one additional 1300, 1400, or 1500 level course.

**Bachelor of Arts in
Anthropology Curriculum**

SOA 1100, Peoples and Cultures; SOA 1104, Cultures of the World; SOC 1100, Introduction to Sociology; and at least three of the following: SOA 1335, Language and Communication; SOA 1125, Stones and Bones: Prehistory in the New World; SOA 1155, Individual and Culture; SOA 1301, Human Origins; SOA 1160, Sex, Sex Roles, and Family; SOA 1425, Cultural Survival; SOA 1146, Rural Workers in the Third World; SOA 1310, Global Markets and Local Cultures; SOA 1470, Myth and Religion; at least six additional anthropology courses; and one sociology elective beyond SOC 1100. Six electives in the social sciences other than sociology/anthropology.

In addition, complete the arts and sciences core curriculum (see page 31).

**Bachelor of Science in
Anthropology Curriculum**

SOA 1100, Peoples and Cultures; SOA 1104, Cultures of the World; SOC 1100, Introduction to Sociology; and at least three of the following: SOA 1335, Language and Communication; SOA 1125, Stones and Bones: Prehistory in the New World; SOA 1155, Individual and Culture; SOA 1301, Human Origins; SOA 1160, Sex, Sex Roles, and Family; SOA 1310, Global Markets and Local Cultures; SOA 1425, Cultural Survival; SOA 1146, Rural Workers in the Third World; SOA 1470, Myth and Religion; at least six additional anthropology courses; and one sociology elective beyond SOC 1100. Six electives in the social sciences other than sociology/anthropology. Four additional electives.

In addition, complete the arts and sciences core curriculum (see page 31).

**Minor in Anthropology
Curriculum**

SOA 1100, Peoples and Cultures; SOA 1104, Cultures of the World; SOA 1335, Language and Communication; SOA 1155, Individual and Culture; SOA 1160, Sex, Sex Roles, and Family; and any two-course specialization in anthropology arranged between the student and adviser.

Theatre

Del Lewis, MFA, *Associate Professor and Chair*

Associate Professors

Janet L. Bobcean, MFA

Nancy Kindelan, PhD

Jerrold A. Phillips, PhD

Clinical Lecturer

Theodore D. Janello, MA

The study of theatre—as performance, visual expression, text, theory, and history—explores the techniques of creatively imaging or re-imaging the experiences of society and of the individual.

The program at Northeastern balances production theory and practice. In the theatre production laboratory, students (majors and non-majors) are involved in experiential learning that synthesizes the ideas, theories, and practices studied in the classroom. All theatre majors participate in laboratory and public performances.

A theatre major may petition to enter one of three concentrations: performance, production, or generalist. Opportunities exist for independent projects, internships, and co-op experiences.

Theatre majors may pursue advanced study in graduate or professional programs, careers as theatre practitioners, or careers in theatre education.

**Bachelor of Arts and
Bachelor of Science
Curriculum**

THE 1100, Introduction to Theatre Arts; THE 1106, THE 1107, Theatre History 1 and 2; THE 1112, Dramatic Theory/Criticism; THE 1114, Masters of Theatre; THE 1149, Script Analysis; THE 1150, Acting 1 (majors section); THE 1180, Concepts of Direction; THE 1200, Stagecraft; THE 1212, Introduction to Theatrical Design; THE 1300, Acting 2; and THE 1800, THE 1801, THE 1802, and THE 1803, Practicum in Production 1, 2, 3, and 4. All theatre majors must take ENG 1658, Introduction to Shakespeare, in the college core curriculum.

All theatre majors should select the following courses in their *freshman* year: (fall quarter) THE 1100, Introduction to Theatre Arts and THE 1200, Stagecraft; (winter quarter) THE 1150, Acting 1 (majors section) and THE 1800, Practicum in Production 1; (spring quarter) THE 1212, Introduction to Theatrical Design and THE 1801, Practicum in Production 2.

After completing 32 quarter hours, theatre majors may choose to be theatre generalists or to concentrate in production or performance. Admission to a concentration is by petition or audition.

Theatre generalist. THE 1116, American Theatre *or* THE 1121, Contemporary Theatre; THE 1210, Scene Design 1; THE 1226, Lighting for the Stage; THE 1261, Costuming 1; THE 1505, Continental Drama; THE 1510, Twentieth Century Theatre; and four courses from the following group: THE 1140, Playwriting; THE 1160, Movement 1; THE 1280, Stage Makeup; THE 1284, Theatre Management; THE 1325, Musical Theatre Technique; or THE 1410, Technical Production.

Concentration in production. THE 1209, Theatrical Drafting; THE 1210, Scene Design 1; THE 1226, Lighting for the Stage; THE 1261, Costuming 1; THE 1284, Theatre Management; THE 1410, Technical Production; THE 1505, Continental Drama; THE 1510, Twentieth Century Theatre; and two courses from the following: THE 1213, Scene Design 2; THE 1225, Scene Painting; THE 1265, Pattern Drafting; THE 1280, Stage Makeup; THE 1400, Costuming 2; or THE 1430, Lighting 2. All production concentration majors must take electives ART 1101, Art History Since 1400 and ART 1124, Basic Drawing.

Concentration in performance. THE 1116, American Theatre *or* THE 1121, Contemporary Theatre; THE 1155, Voice for the Theatre; THE 1160, Movement 1; THE 1280, Stage Makeup; THE 1301, THE 1302, Acting 3 and 4; THE 1316, Acting for the Camera; THE 1325, Musical Theatre Technique; THE 1505, Continental Drama; and THE 1510, Twentieth Century Theatre. All performance concentration majors must take 4 quarter hours of dance/physical education electives (HSL).

All students must complete the arts and sciences core curriculum (see page 31).

Minor Curriculum

THE 1100, Introduction to Theatre Arts; THE 1106, THE 1107, Theatre History 1 and 2; THE 1150, Acting 1 (majors section) (winter quarter); THE 1180, Concepts of Direction; THE 1200, Stagecraft; THE 1212, Introduction to Theatrical Design; THE 1800, THE 1801, Practicum in Production 1 and 2; and one of the following: THE 1149, Script Analysis; THE 1210, Scene Design 1; THE 1226, Lighting for the Stage; THE 1261, Costuming 1; and THE 1300, Acting 2. Laboratory practice in technical theatre and performance, in conjunction with the coursework, is required for the minor.

Music majors who wish to minor in musical theatre must take the following courses. THE 1100, Introduction to Theatre Arts; THE 1111, American Musical Theatre; THE 1149, Script Analysis; THE 1150 and THE 1300, Acting 1 (majors section) (winter quarter) and 2; THE 1160, Movement 1; THE 1325, Musical Theatre Technique; THE 1800, THE 1801, THE 1802, and THE 1803, Practicum in Production 1, 2, 3, and 4. Laboratory practice in technical theatre and performance, in conjunction with the coursework, is required.

Bouvé College of Pharmacy and Health Sciences

James J. Gozzo, PhD, *Dean*

Mehdi Boroujerdi, PhD, *Associate Dean for Pharmacy*

Patrick F. Plunkett, EdD, *Associate Dean for Academic Affairs*

Ena Vasquez-Nuttal, EdD, *Associate Dean and Director of the Graduate School*

Anne M. Ahern, MEd, *Director of the Office of Student Services*

Nancy P. Warner, MS, *Academic Counselor*

Carol M. Konis, *Assistant to the Dean*

Barry Kass, MBA, *Director of Continuing Education and Development*

The programs in Bouvé College of Pharmacy and Health Sciences combine cooperative education experiences with highly innovative academic curricula that are designed to meet the demand for well-educated pharmacists and allied health professionals. The college prepares students to become effective professional practitioners, enter graduate schools, and work in many areas responsible for the delivery of health care.

The college offers students a health-care education that features a curriculum of highly relevant and closely integrated basic courses in the physical, biological, behavioral, and administrative sciences; on-site involvement in clinical patient care; a cooperative education work program, including a pharmacy externship-internship period and clinical affiliations in physical therapy and other health professions; and a commitment to the search for and advancement of new and progressive concepts, ideas, and philosophies of education and professional practice.

Each of the programs offered by the college is accredited by the appropriate professional group. The college is a member of the American Association of Colleges of Pharmacy and the Association of Schools of Allied Health Professions.

Class Entrance Requirements

Listed below are the overall quality-point averages required for students to advance to the next rank and to graduate.

Sophomore	1.8
Middler	2.0
Junior	2.0
Senior	2.0
To graduate	2.0

In addition, students are required to attain a grade of C– or better in professional courses (CPS, MLS, PAH [except PAH 1135], PCL, PCT, PHP, PMC, and TOX); and a C or better in professional courses (ATP and PTH). A required course in which an F or W grade is received can be repeated only once. If a grade of D is not considered passing in a professional course, the course can be repeated only once.

Medical laboratory science special requirements. A grade of C– or better must be earned in each professional course (MLS) in the program. To enter professional courses in the sophomore year, you must obtain a minimum quality-point average of 2.0 in all science courses, including mathematics, chemistry, biology, and basic medical laboratory science. To enter professional courses in the middler year, you must have a minimum quality-point average of 2.0 and have earned a C– or better in all professional courses. To enter clinical studies in the junior and senior years, you must have a minimum quality-point average of 2.5 and have earned a C– or better in all professional courses.

To be eligible for graduation, a baccalaureate degree candidate must have completed the specified curriculum with a minimum quality-point average of 2.5 and have earned a C– or better in all professional courses.

Cardiopulmonary sciences special requirements. In addition to the general grade requirement of at least a C– in all professional courses (CPS), students are required to maintain a quality-point average of at least 2.0 in the following professionally related courses to enter quarter 6: BIO 1120, BIO 1140, CHM 1111, CHM 1122, MTH 1107, PAH 1202, PAH 1204, and PHY 1201.

Toxicology special requirements. A grade of C or better is required in each toxicology course. A cumulative quality-point average of 2.0 is required for graduation. Professional electives cannot be taken on a pass/fail basis. An average of 2.5 or better overall is required of all students transferring into the program.

Physical therapy special requirements. During the first two years, physical therapy students must achieve a grade of C or better in each of the prerequisite sciences as well as in each professional course; all deficiencies, if any, must be cleared before a student may progress into the middler year. Beginning with quarter 6, students must achieve a grade of C or better in each professional course to progress to the next academic quarter. In addition, specific academic requirements govern performance in the physical therapy program and department.

Athletic training special requirements. A grade of C or better must be earned in each professional course in the program. A minimum quality point average of 2.0 is required for field experience.

Open Option Program

The Open Option Program is designed for students who are undecided about a profession but are interested in a career in health care. The program offers freshmen a core of courses designed to provide the basic scientific background for each of the professional programs in the college in addition to a one quarter-hour health careers seminar.

Satisfactory completion of all freshman-year courses, including the Open Option core curriculum, is necessary for admission to one of the professional programs of the college. The Open Option plan does not apply to the dental hygiene, pharmacy, and physical therapy programs.

Transfer Credit

The college may accept qualified transfer students who have successfully completed one or more years of preprofessional coursework in an accredited college or university. No student transferring from another college or university may receive a degree unless the last three quarters of academic work immediately preceding graduation have been completed at Northeastern.

Athletic Training

Chad A. Starkey, PhD, *Program Director*

Faculty listed under Physical Therapy

The five-year Bachelor of Science in education program is designed for students interested in careers as athletic trainers. Working under a physician's supervision, athletic trainers are members of the sports medicine field who specialize in the prevention, treatment, and rehabilitation of athletic injuries.

The athletic trainer's duties include advising on proper conditioning techniques to help reduce the chance of injury, assessing the severity of injuries that do occur, applying appropriate treatment to aid the healing process, and supervising post-injury rehabilitation programs. Athletic trainers work with secondary school, college, and professional athletic teams and may be employed in private clinics.

Students may petition for acceptance into the athletic training program after successfully completing their first year of academic study. To be accepted into the program, applicants must maintain at least a 2.0 quality-point average during their first year. Students must achieve a grade of C (2.0) or better in all professional courses and all basic science courses. In order to complete the athletic training program, students must complete a minimum of 1,000 hours' work with athletic teams in approved settings.

The program is approved by the National Athletic Trainers Association. Students who graduate from the athletic training program are eligible to sit for the National Athletic Trainers Association Certification Examination. Upon passing the examination, an individual may apply for Massachusetts licensure as an athletic trainer.

Bachelor of Science Curriculum

Quarter 1	CHM 1111, General Chemistry 1; COM 1105, Computer Science and Its Applications; ENG 1110, Freshman English 1; and MTH 1106, Fundamentals of Mathematics.
Quarter 2	ATP 1000, Introduction to Athletic Training; BIO 1152, Integrated Human Anatomy and Physiology 1; CHM 1112, General Chemistry 2; and ENG 1111, Freshman English 2.
Quarter 3	BIO 1153, Integrated Human Anatomy and Physiology 2; PSY 1111, Foundations of Psychology 1; SOC 1100, Introduction to Sociology; and one elective.
Quarter 4	ATP 1100, Prevention and Care of Athletic Injuries; ATP 1101, Athletic Training Laboratory; BIO 1154, Integrated Human Anatomy and Physiology 3; PHY 1201, Physics for the Life Sciences 1; PHY 1501, Physics Lab; and one elective.
Quarter 5	ATP 1200, Clinical Athletic Training; PHY 1202, Physics for the Life Sciences 2; PTH 1250, Functional Anatomy and Biomechanics 1; and one elective.
Quarter 6	ATP 1300, Advanced Athletic Training 1; CRS 1314, Introduction to Counseling; PSY 1112, Foundations of Psychology 2; and PTH 1300, Functional Anatomy and Biomechanics 2.
Quarter 7	ATP 1350, Advanced Athletic Training 2; ATP 1390, Athletic Training Practicum 1; PTH 1600, Neuroscience; Middler-Year Writing Requirement; and one elective.
Quarter 8	ATP 1400, Therapeutic Modalities; ATP 1490, Athletic Training Practicum 2; CPS 1612, Exercise Physiology; and HSL 1468, Overview of Disabilities.

Quarter 9	ATP 1500, Therapeutic Reconditioning; ATP 1590, Athletic Training 3; MTH 1150, Probability, Statistics and the Computer; HSL 1286, Nutrition; and one elective.
Quarter 10	ATP 1600, Organization and Administration of Athletic Training; ATP 1690, Athletic Training Practicum 4; PTH 1405, Research for Physical Therapists; and SOC 1195, Drugs in Society.
Quarter 11	ATP 1800, Senior Seminar; one health elective; and two general electives.

Cardiopulmonary Sciences

Mary E. Watson, EdD, RRT, *Associate Professor and Chair*

Associate Professors

Thomas A. Barnes, EdD, RRT

Marilyn A. Cairns, ScD

William J. Gillespie, EdD

Patrick F. Plunkett, EdD, RRT

Donald Schneider, PhD

Assistant Clinical Specialist

Maura A. Brunock, BS

Joseph A. Curro, MBA, RRT

The Bachelor of Science degree program in the Department of Cardiopulmonary Sciences offers a common core curriculum in arts and sciences and cardiopulmonary sciences, as well as an opportunity to concentrate in cardiovascular technology, exercise physiology, or respiratory therapy.

Seminar courses in the first and second year are designed to give students information about professional options within the field of cardiopulmonary sciences so that they may make informed decisions about their specialization.

Cardiovascular Technology

The program in cardiovascular technology helps prepare students to assist cardiologists in performing diagnostic and interventional cardiac catheterizations, cardiac electrophysiology studies, pacemaker implantations, research protocols, and noninvasive testing such as echocardiography and nuclear imaging.

Before these procedures, the cardiovascular technologist prepares the instrument table, the procedure site, and the patient for the physician while maintaining sterile techniques at all times; attaches instruments for obtaining hemodynamic measurements throughout the procedure; and supplies all desired catheters, wires, sheaths, balloons, and devices needed by the physician.

During the procedures, the cardiovascular technologist is usually responsible for operating monitoring equipment and obtaining vital measurements from the patient, performing calculations from data, and informing physicians of any abnormal measurements or any changes in pressures or electrocardiograms. The cardiovascular technologist must be able to adapt preparations and procedures to meet the requirements of the individual case while maintaining the flexibility to deal with different situations.

All students in the cardiovascular technology specialization study fundamentals of cardiovascular technology, advanced cardiovascular technology, imaging modalities, echocardiography, clinical seminars, and clinical practice courses.

Most cardiovascular technologists work in hospitals as part of the health-care team. Others pursue biomedical research positions in companies or health-care facilities. Graduates are eligible for the registry examination for cardiovascular technology given by the National Society for Cardiopulmonary Technology. Upon successful completion of the exam, an individual is designated a Registered Cardiovascular Technologist (RCVT).

Exercise Physiology

An exercise physiologist develops, implements, and coordinates exercise programs and administers exercise tests, usually under the supervision of a physician. A clinical exercise physiologist assesses the patient's status, prescribes appropriate exercise, and counsels and educates patients with cardiovascular, pulmonary, and/or metabolic diseases.

All students in the exercise physiology specialization take courses in exercise physiology, exercise testing, prescription and programming, clinical kinesiology, cardiopulmonary assessment, electrocardiography, organization and administration of rehabilitation programs, and practicum experiences in exercise physiology. Students may then choose an emphasis in either experimental exercise physiology or noninvasive cardiovascular technology. Students concentrating in experimental exercise physiology take courses in organic chemistry and biochemistry, physics, and calculus. Students who focus on noninvasive cardiovascular technology take courses in echocardiography and imaging modalities and complete a cardiovascular technology practicum.

Exercise physiology is an emerging and expanding profession within the health services industry. Exercise physiologists are employed in hospitals and outpatient clinics or in corporate and commercial centers in health promotion, wellness, fitness, and rehabilitation programs.

The American College of Sports Medicine has developed certification programs for professionals in the clinical areas of cardiovascular and pulmonary rehabilitation and in the health and fitness field. Graduates from the exercise physiology program are eligible to sit for either the exercise specialist or exercise test technologist certifications in the clinical area or the health fitness instructor certification in the health and fitness field.

Respiratory Therapy

Respiratory therapy is instrumental in the diagnosis, treatment, management, and preventive care of patients with cardiopulmonary problems. Patients suffering from a variety of acute or chronic disabling conditions may be found in newborn nurseries, surgical and medical units, emergency rooms, outpatient departments, and intensive care units.

Respiratory therapists are involved in treating disorders such as cardiac failure, asthma, pulmonary edema, emphysema, cerebral thrombosis, drowning, hemorrhage, and shock. The respiratory therapist is a life-support specialist trained in airway management, artificial ventilation, external cardiac massage, and other sophisticated emergency support measures.

Working under physicians' orders, respiratory therapists carry out specific therapeutic measures. They must provide and recommend specialized care and be skilled in such areas as medical gas administration; humidification, aerosols, and intermittent positive pressure breathing (IPPB); chest physiotherapy; cardiopulmonary resuscitation; mechanical ventilation; airway management; pulmonary function studies; blood gas analysis; and physiologic monitoring.

All students in the respiratory therapy specialization take several respiratory therapy didactic, laboratory, seminar and clinical practice courses.

After successful completion of the program, students are eligible to take the respiratory therapy registry examination administered by the National Board for Respiratory Care. Those who pass the exam earn the classification Registered Respiratory Therapist (RRT). The program is accredited by the Commission on Accreditation of Allied Education Programs.

**Bachelor of Science in
Cardiopulmonary Science
Curriculum**

Quarter 1	CHM 1105, General Chemistry 1; COM 1105, Computer Science and Its Applications, CPS 1111, Cardiopulmonary Sciences Seminar 1; ENG 1110, Freshman English 1; and PSY 1111, Foundations of Psychology.
Quarter 2	BIO 1140, Animal Biology 1; CHM 1106, General Chemistry 2; CPS 1112, Cardiopulmonary Sciences Seminar 2; HSL 1282, Wellness; and SOC 1100, Introduction to Sociology.
Quarter 3	BIO 1120, Microbiology; CPS 1114, Basic Life Support; ENG 1111, Freshman English 2; MTH 1107, Functions and Basic Calculus; and one arts and sciences elective.
Quarter 4	PAH 1202, Anatomy & Physiology 1; PHY 1201, Physics for the Life Sciences 1; PHY 1501, Physics Lab; one humanities elective; and one open elective.
Quarter 5	CPS 1113, Cardiopulmonary Sciences Seminar 3; MTH 1150, Probability, Statistics, and the Computer; PAH 1204, Anatomy & Physiology 2; PHL 1165, Moral Problems in Medicine; and one humanities elective.

**Cardiovascular
Technology Curriculum**

Additional Courses: Cardiopulmonary Physiology; Pathophysiology; Physics for Life Sciences; Nutrition; Cardiopulmonary Disease; Writing for the Health Professions; Exercise Physiology 1; Research Design; Health Science Education; Pharmacology; Electrocardiography; Cardiopulmonary Assessment; Fundamentals of Cardiovascular Technology; Clinical Seminars; Advanced Cardiovascular Technology; Cardiovascular Technology Practicum 1 and 2; Imaging Modalities; Echocardiography; Advanced Cardiac Life Support; and arts and sciences electives.

**Exercise Physiology
Curriculum**

Additional Courses: Cardiopulmonary Physiology; Clinical Kinesiology; Pathophysiology; Physics for the Life Sciences; Nutrition; Cardiopulmonary Disease; Writing for the Health Professions; Exercise Prescription and Program; Exercise Physiology 1, Research Design; Health Science Education; Cardiopulmonary Assessment; Electrocardiography; Pharmacology; Clinical Practicum 1, 2 and 3; Medical Monitoring; Exercise Physiology; Clinical Seminars; Administrative Rehabilitation Programs; Advanced Cardiac Life Support; and electives.

**Respiratory Therapy
Curriculum**

Additional Courses: Cardiopulmonary Physiology; Pathophysiology; Physics for the Life Sciences; Nutrition; Cardiopulmonary Disease; Writing for the Health Professions; Exercise Physiology 1; Research Design; Health Science Education; Introduction to Respiratory Care; Professional Practice Laboratories; Pharmacology; Cardiopulmonary Assessment; Electrocardiography; Practicum in Respiratory Care 1, 2 and 3; Respiratory Care for the Medical and Surgical Patient; Advanced Cardiac Life Support; and electives.

Dental Hygiene

Linda Hanlon, RDH, BS, MEd, *Dean*
M. Barbara Schulze, RDH, BS, MEd, *Associate Dean and Registrar*
Judith S. Harvey, CDA, BA, MEd, *Director of Admissions*

The Forsyth School of Dental Hygiene conducts a program of dental hygiene education in cooperation with Northeastern University. Students attend classes at both the Forsyth Dental Center and Northeastern. The dental hygienist is the "preventive oral health professional licensed in dental hygiene, who provides educational, clinical, and therapeutic services supporting total health through the promotion of optimal oral health." In other words, the dental hygienist is that member of the oral health team who is responsible for the preventive aspects of dental treatment.

Graduates receive the Certificate in Dental Hygiene from the Forsyth School and the Associate in Science or Bachelor of Science in dental hygiene from Northeastern University. Graduates must satisfy the state dental hygiene licensure requirements before they may practice.

These programs are accredited by the Commission on Dental Accreditation of the American Dental Association, an accrediting body approved by the United States Department of Education.

Application should be made directly to the Forsyth School of Dental Hygiene, Office of Admissions, 140 The Fenway, Boston, MA 02115. For an application and a copy of the college catalogue, write that office or call 617-262-5200, extension 211, 212, or 213, FAX 617-262-4021.

Bachelor of Science Curriculum

Quarter 1	BIO 1115, Introduction to Human Biology; DHY 1204, Head and Neck Anatomy; ENG 1110, Freshman English 1; MTH 1106, Functions and Algebra; and PSY 1111, Foundations of Psychology 1.
Quarter 2	CHM 1105, Chemistry for Health Science 1; DHY 1101, Dental Hygiene Orientation 1; ENG 1111, Freshman English 2; and SOC 1100, Introduction to Sociology.
Quarter 3	BIO 1120, Basic Microbiology; CHM 1106, Chemistry for Health Science 2; DHY 1102, Dental Hygiene Orientation 2; and one Northeastern University elective.
Quarter 4	BIO 1150, Human Anatomy and Physiology; DHY 1100, Oral Anatomy & Histology; DHY 1211, Dental Hygiene Theory 1; DHY 1220, Radiology 1; and DHY 1611, Clinical Dental Hygiene 1.
Quarter 5	BIO 1151, Human Anatomy and Physiology 2; DHY 1209, Periodontology; DHY 1212, Dental Hygiene Theory 2; DHY 1221, Radiology 2; and DHY 1612, Clinical Dental Hygiene 2.
Quarter 6	DHY 1240, Nutrition; DHY 1214, Dental Hygiene Theory 3; DHY 1228, Dental Materials; DHY 1613, Clinical Dental Hygiene 3; PHP 1303, Interpersonal Skills for Health Professionals; and one Northeastern University elective (optional).
Quarter 7	DHY 1308, Pathology; DHY 1317, Dental Hygiene Theory 4; DHY 1330, Pharmacology; DHY 1614, Clinical Dental Hygiene 4; and MTH 1152, Statistical Thinking.
Quarter 8	DHY 1315, Dental Hygiene Theory 5; DHY 1331, Pain Control; DHY 1361, Public Health; DHY 1615, Clinical Dental Hygiene 5; and one Northeastern University elective.
Quarter 9	DHY 1316, Dental Hygiene Theory 6; DHY 1362, Community Health; DHY 1364, Law and Ethics; DHY 1616, Clinical Dental Hygiene 6; and one Northeastern University elective.
Quarter 10	DHY 1301, Introduction to Oral Health Research; DHY 1401, Oral Health Gerontology; ENG 1125, Technical Writing 1; and one Northeastern University elective.
Quarter 11	DHY 1402, Advanced Public Health; PAH 1135, Professional Dynamics in the Health Care Delivery System; and two Northeastern University electives.
Quarter 12	DHY 1403, Dental Seminars; DHY 1410, Independent Study; and DHY 1550, Internship.

Associate in Science Curriculum

Quarter 1	BIO 1150, Human Anatomy and Physiology 1; DHY 1100, Oral Anatomy and Histology; DHY 1204, Head and Neck Anatomy; DHY 1211, Dental Hygiene Theory 1; DHY 1220, Radiology 1; and DHY 1611, Clinical Dental Hygiene 1.
Quarter 2	BIO 1151, Human Anatomy and Physiology 2; DHY 1209, Periodontology; DHY 1212, Dental Hygiene Theory 2; DHY 1221, Radiology 2; and DHY 1612, Clinical Dental Hygiene 2.
Quarter 3	BIO 1120, Basic Microbiology; DHY 1240, Nutrition; DHY 1214, Dental Hygiene Theory 3; DHY 1228, Dental Materials; and DHY 1613, Clinical Dental Hygiene 3.
Quarter 4	DHY 1308, Pathology; DHY 1317, Dental Hygiene Theory 4; DHY 1330, Pharmacology; DHY 1614, Clinical Dental Hygiene 4; and ENG 1110, Freshman English 1.
Quarter 5	DHY 1315, Dental Hygiene Theory 5; DHY 1331, Pain Control; DHY 1361, Public Health; DHY 1615, Clinical Dental Hygiene 5; and PSY 1111, Foundation of Psychology 1.
Quarter 6	DHY 1316, Dental Hygiene Theory 6; DHY 1362, Community Health; DHY 1364, Law and Ethics; DHY 1616, Clinical Dental Hygiene 6; ENG 1111, Freshman English 2; and SOC 1100, Introduction to Sociology.

Health Information Administration

The Health Information Administration Program, formerly offered through the full-time day undergraduate college, will be offered through our evening division, University College. The program will be offered as an accelerated or part-time program. For further information, call 617-373-2818.

Medical Laboratory Science

Barbara E. Martin, MHP, MT(ASCP), CLS(NCA), *Director and Senior Clinical Specialist*

Professor	Associate Professors	Laboratory Coordinator
James J. Gozzo, PhD	Judith T. Barr, ScD, CLS(NCA) Britta L. Karlsson, MS, MT(ASCP), CLS(NCA) Edward W. Schroder, PhD, M(ASCP)	Judith Baronas, BS, MT(ASCP)

The Department of Medical Laboratory Science prepares professionals in the laboratory disciplines of clinical chemistry, hematology, immunohematology, immunology, and microbiology. Medical laboratory scientists (medical technologists) perform diagnostic test procedures using state-of-the-art computerized analyzers. They are responsible for overseeing patient specimen collection, and for test accuracy, cost-effectiveness, and efficiency in reporting results to physicians. Physicians rely on laboratory tests to establish a diagnosis and to determine therapy. Traditionally the program has prepared students for positions in health-care delivery, but, through cooperative education experiences, it also offers students the opportunity to explore positions in biological research, the biotechnology industry, and governmental agencies. Many graduates enter responsible positions in these areas. The curriculum also provides excellent preparation for advanced studies in graduate and professional schools.

The five-year program leads to a Bachelor of Science degree. Students begin the experiential learning phase of the program during their sophomore year, with cooperative education placements in regional institutions. Upper class students have the opportunity for international placements. Recently students have had co-ops in Sweden and England. In their junior and senior years students receive formal clinical training at some of metropolitan Boston's finest health-care facilities. To enter clinical training students must complete all prerequisite courses and maintain an acceptable quality-point average. Graduates of the Bachelor of Science program are eligible for national certification examinations as medical technologists and clinical laboratory scientists. Some states require additional licensure examinations.

The department also offers a three-year Associate in Science program that culminates in eligibility for national certification examinations at the level of medical or clinical laboratory technician. Students may use this option to enter the medical laboratory profession. Qualified students may apply associate degree coursework toward subsequent studies for the baccalaureate degree.

Bachelor of Science Curriculum

Quarter 1	CHM 1111, General Chemistry 1; ENG 1110, Freshman English 1; MLS 1101, MLS Orientation 1; MTH 1106, Fundamentals of Mathematics <i>or</i> MTH 1107, Functions and Basic Calculus and one elective.
Quarter 2	BIO 1106, General Biology; CHM 1122, General Chemistry 2; MLS 1102, MLS Orientation 2; PAH 1135, Professional Dynamics in Health Care Delivery; PHY 1201, Physics 1; and PHY 1501, Physics 1 Laboratory (optional).
Quarter 3	BIO 1107, Animal Biology; ENG 1111, Freshman English 2; MLS 1103, Laboratory Techniques; PHY 1202, Physics 2; PHY 1502, Physics 2 Laboratory; and one elective.
Quarter 4	CHM 1264, Organic Chemistry 1; MLS 1112, Renal Physiology and Urinalysis; MLS 1212, Urinalysis Laboratory; PAH 1210, Anatomy and Physiology; and one elective.
Quarter 5	CHM 1265, Organic Chemistry 2; MLS 1172, Basic Immunology; PAH 1212, Anatomy and Physiology; and one elective.
Quarter 6	BIO 1260, Genetics and Developmental Biology; CHM 1221, Analytical Chemistry; MLS 1145, Microbiology; MLS 1245, Microbiology Laboratory; and one elective.
Quarter 7	BIO 1261, Cell Physiology and Biochemistry; ENG 1340, Writing Workshop; MLS 1648, Advanced Microbiology; MLS 1649, Parasitology and Mycology; and one elective.

Quarter 8	MLS 1125, Hematology; MLS 1132, Immunohematology; MLS 1152, Clinical Chemistry; MLS 1225, Hematology Laboratory; MLS 1252, Clinical Chemistry Laboratory; MLS 1661, MLS Education; and one elective (optional).
Quarter 9	MLS 1232, Immunohematology Laboratory; MLS 1621, Advanced Hematology; MLS 1631, Advanced Immunohematology; MLS 1656, Advanced Clinical Chemistry; one elective; and one elective (optional).
Quarter 10	MLS 1523, Hematology MT Applied Study; MLS 1544, Clinical Microbiology MT Applied Study; MLS 1573, Immunology I MT Applied Study 2; and MLS 1665, Management.
Quarter 11	MLS 1533, Immunohematology MT Applied Study; MLS 1552, MT Clinical Chemistry Applied Study; MLS 1574, Immunology 2 MT Applied Study, Senior Seminar.

Minor Curriculum

This minor provides students majoring in other science fields an opportunity to explore the principles of the biological and chemical sciences as applied in the medical laboratory. Students may specialize in one of the five categorical areas of MLS: clinical chemistry, hematology, immunology, immunohematology, or microbiology. Four to five MLS courses are required for each minor. Upon completing the categorical minor, the student will be eligible for categorical national certification examination. Interested students must contact the MLS minor adviser in 206 Mugar to select appropriate courses. Prerequisites: General Chemistry 1 and General Biology for all except students specializing in clinical chemistry.

Pharmacy

Department of Pharmaceutical Sciences

Robert N. Hanson, PhD, *Professor and Chair*

Professors

Mehdi Boroujerdi, PhD
Richard C. Deth, PhD
Roger W. Giese, PhD
James J. Gozzo, PhD
Ban An Khaw, PhD

Associate Professors

Norman R. Boisse, PhD
Ralph H. Loring, PhD
Robert A. Schatz, PhD
Edward W. Schroder, PhD
Barbara L. Waszczak, PhD

Assistant Professors

Mansoor Amiji, PhD
Jonathan Freedman, PhD
Eric J. Mack, PhD

Lecturer

Eric S. Hall, PhD

Department of Pharmacy Practice

William E. Smith, PharmD, MPH, PhD, *Associate Professor and Chair*

Professor

Gerald E. Schumacher,
PharmD, PhD

Associate Professors

Judith T. Barr, ScD
Robert J. Cersosimo, PharmD
Louise G. Cohen, PharmD
Samuel J. Matthews, PharmD

Assistant Professors

Eric M. Hillson, PhD
Kristin C. Oberg, PharmD
Raafat A. Seifeldin,
PharmD, PhD

Assistant Clinical Specialist

Todd A. Brown, BS

Pharmacists prepare and dispense the drugs prescribed by physicians. The increased use of the pharmacist as a clinical drug consultant to physician and nursing staffs has broadened the scope of professional opportunity and given practitioners greater involvement as part of the health-care team.

Pharmacy also offers careers in management research, manufacturing, government, law enforcement, and education. Many graduates of the pharmacy program go on to leading graduate schools.

The college offers a five-year curriculum leading to the Bachelor of Science in pharmacy degree. The curriculum offers a blend of academic classroom and cooperative education experiences. The undergraduate pharmacy program subscribes to the standards established by the American Council on Pharmaceutical Education and the American Association of Colleges of Pharmacy.

Candidates for the Bachelor of Science in pharmacy degree must complete all prescribed courses—a minimum of 227 quarter hours. Students must maintain an overall quality-point average of C (2.0) and a C average in required pharmacy courses. They must meet the requirements of the Department of Cooperative Education to be eligible for the degree.

Pharmacists must meet certain requirements to obtain a license from the state in which they want to practice. These requirements ordinarily include graduating from an accredited college of pharmacy, passing an examination given by a state board of pharmacy, and completing an internship.

The internship is a period of supervised practical experience in a preceptor pharmacy. This requirement is generally satisfied during the cooperative education periods, which commence during the student's second academic year. Students may apply up to 400 hours of the required academic

clinical clerkship experience to their internship requirements. In addition, a college-directed externship adds to the total practice-oriented portion of the curriculum.

Pharmacy requires a significant amount of patient contact. Counseling by the pharmacist is considered essential to the effective and safe use of medications. Community pharmacy offers the opportunity to combine specialized pharmaceutical training with skills in management, business administration, and marketing. In addition to the patient contact and counseling, community pharmacists also spend considerable time discussing health-related matters with the prescribing physicians. Hospital and clinical pharmacists have the opportunity to apply clinical skills on a day-to-day basis; they may accompany other health-care professionals on ward rounds and consult with physicians on individual therapeutic regimens. Opportunities are expanding for pharmacists elsewhere. Health maintenance organizations (HMOs) and private groups, nursing homes and retirement complexes, the Public Health Service, health facilities, health systems, the armed services, and law enforcement agencies such as the Federal Drug Enforcement Administration all require pharmacists. Other graduates find employment in drug production or marketing with pharmaceutical companies, colleges of pharmacy, or in journalism. A growing number of pharmacy graduates seek additional professional training in pharmaceutical sciences, management, or law.

Bachelor of Science Curriculum

Quarter 1	BIO 1106, General Biology; CHM 1111, General Chemistry 1; MTH 1106, Fundamentals of Mathematics <i>or</i> MTH 1107, Functions and Basic Calculus; PHP 1100, The Profession of Pharmacy; and one arts and sciences elective.
Quarter 2	BIO 1107, Animal Biology; ENG 1110, Freshman English 1; MTH 1107, Functions and Basic Calculus <i>or</i> MTH 1108, Calculus; and PAH 1135, Professional Dynamics in Health Care Delivery.
Quarter 3	CHM 1122, General Chemistry 2B; ENG 1111, Freshman English 2; MTH 1108, Calculus <i>or</i> an open elective; and one arts and sciences elective.
Quarter 4 (Entire class) (Sept.–Dec.)	CHM 1268, Organic Chemistry 1; PCT 1240, Pharmaceutical Calculations <i>or</i> PAH 1202, Anatomy and Physiology 1; PHY 1201, Physics 1; and one arts and sciences elective.
Quarter 4A (Entire class) (Jan.–March)	CHM 1269, Organic Chemistry 2; PAH 1202, Anatomy and Physiology 1 <i>or</i> PCT 1240, Pharmaceutical Calculations; PHY 1203, Physics 3; and one arts and sciences elective.
Quarter 5 (April–June and June–Sept.)	COM 1105, Computer Science and Its Applications; ENG 1340, Writing Workshop; PAH 1204, Anatomy and Physiology 2; PAH 1280, Biochemistry; and PHP 1303, Interpersonal Skills for Health Professionals.
Quarter 6	PCT 1310, Pharmaceutics Lab 1; PCT 1340, Pharmaceutics 1; PHP 1411, Pathophysiology; PMC 1322, Pharmaceutical Biotechnology; and PMC 1419, Pharmacology/Medicinal Chemistry 1.
Quarter 7	BIO 1121, Microbiology; PCL 1420, Pharmacology/Medicinal Chemistry 2; PCL 1451, Pharmacology Lab; PCT 1320, Pharmaceutics Lab 2; and PCT 1350, Pharmaceutics 2.
Quarter 8	PCL 1422, Pharmacology/Medicinal Chemistry 3; PCT 1440, Biopharmaceutics/Pharmacokinetics; PHP 1301, Pharmaceutical Jurisprudence; and PMC 1421, Antiinfectives.
Quarter 9 (Entire Class) (April–June)	PHP 1401, Drug Information and Evaluation; PHP 1441, Therapeutic Drug Monitoring; PHP 1601, Nonprescription Medication; and PHP 1609, Pharmacotherapeutics.
Quarter 10 (Summer/ Winter)	PHP 1302, Pharmacy Administration 1; PHP 1304, Social Pharmacology; PHP 1402, Parapharmaceuticals; PHP 1503, Professional Practice Lab; one professional elective; and one arts and sciences elective.
Quarter 10A (Fall/Spring)	PHP 1305, Hospital Pharmacy Management <i>or</i> PHP 1306, Community Pharmacy Management; TOX 1300, Clinical Toxicology; one professional elective; and one arts and sciences elective.
Quarter 11	PHP 1501, Community Pharmacy Externship.
Quarter 12	PHP 1505, Hospital Externship and PHP 1506, Clinical Clerkship.

Entry-Level PharmD

The College offers a PharmD entry-level tracking curriculum. This program is offered to a limited number of Northeastern University pharmacy junior students. Students entering the Pharmacy Program will have the opportunity to track into the entry-level PharmD program in their junior year, contingent upon their maintaining a QPA of 2.75 or better.

Physical Therapy

Meredith H. Harris, EdD, *Associate Professor and Acting Chair*

Associate Professors

Janice S. Bruckner, PhD
Robert Sikes, PhD

Assistant Professors

Chad A. Starkey, PhD,
*Program Director,
Athletic Training*
Shirley Stockmeyer, MA

Associate Clinical Specialist

Cindy I. Buchanan, MS

Assistant Clinical Specialists

Ann L. Charrette, MS, PCS
Nancy L. Kiernan, MPT
Sonya L. Larrieux, MA
Mary O'Brien, MPH
Nancy H. Sharby, MS

The physical therapy program prepares its graduates to provide quality patient care in a time of changing concepts, trends, and challenges. Students learn to help clients gain functional independence and to recognize and manage the emotional and socioeconomic problems that affect recovery.

Physical therapists evaluate the condition of the patient, plan and execute treatment programs developed to meet the patient's treatment goals, and periodically reassess those treatment goals. In addition, they develop injury-prevention and health-promotion activities and are trained to integrate their treatment plans into the total care plan for the patient. Additional responsibilities may include health-care planning and community service.

Physical therapists are employed in private practices; community and university hospitals; rehabilitation centers; schools or centers for disabled children; extended care facilities; freestanding outpatient clinics; home health agencies; and community, state, and federal agencies. They are also involved in research and teaching.

Northeastern's physical therapy program is one of the few programs that accepts students directly into the freshman class. Students are physical therapy majors on their first day of classes, and there are no additional admission steps at any point. To continue in the program, students must maintain acceptable standards of scholarship and academic performance (as outlined in the student handbook) and must develop appropriate motor skills, professional behavior, and emotional maturity.

The department's five-year Bachelor of Science program stresses clinical problem solving. In the classroom students develop problem-solving skills, manual dexterity, and proficiency in technique and equipment. Cooperative education experiences give students a chance to apply knowledge gained in the classroom to clinical practice and to become members of the health-care community early in their studies.

In addition to cooperative education, the program includes periods of clinical experience, called affiliations, during which the student performs all duties of the physical therapist under the supervision of a licensed physical therapist.

Cooperative education placements and affiliations are available in a wide range of specialties and are located at sites throughout the country.

The curriculum in physical therapy is accredited by the Commission on Accreditation in Physical Therapy Education of the American Physical Therapy Association.

Graduates of the Bachelor of Science program are eligible to sit for the Physical Therapy Licensure Examination.

Bachelor of Science Curriculum

Quarter 1	CHM 1105, Chemistry for Health Science 1; MTH 1106, Fundamentals of Mathematics or MTH 1107, Functions and Basic Calculus; PSY 1111, Foundation of Psychology 1, PTH 1007, Cooperative Education in Physical Therapy; and electives.
Quarter 2	BIO 1152, Integrated Human Anatomy and Physiology 1; CHM 1106, Chemistry for Health Science 2; COM 1105, Computer Science and Its Applications; ENG 1110, Freshman English 1; and electives.
Quarter 3	BIO 1153, Integrated Human Anatomy and Physiology 2; ENG 1111, Freshman English 2; MTH 1150, Probability, Statistics and the Computer; PTH 1114, Introduction to Physical Therapy; and electives.
Quarter 4	BIO 1154, Integrated Human Anatomy and Physiology 3; PHY 1201, Physics 1; PHY 1501, Physics 1 Lab; PTH 1118, Developmental Basis of Human Performance; and electives. (PTH 1114, Introduction to Physical Therapy; for transfers only.)
Quarter 5	PHY 1202, Physics 2; PSY 1112, Foundation of Psychology 2; PTH 1202, Therapeutic Modalities in Physical Therapy Practice; CPS 1612, Exercise Physiology; and two electives.
Quarter 6	PTH 1310, Clinical Gross Anatomy; PTH 1316, Neuromuscular Physiology; PTH 1320, Soft Tissue Mobilization; and PTH 1325, Clinical Medicine 1.

Quarter 7	ENG 1340, Writing Workshop; PTH 1330, Clinical Kinesiology; PTH 1335, Musculoskeletal Evaluation; PTH 1341, Musculoskeletal Therapeutic Exercise; PTH 1345, Orthopedic Clinical Medicine; and PTH 1352, Psychosocial Aspects of Illness.
Quarter 8	PTH 1356, Prosthetics; PTH 1360, Neurological Therapeutic Exercise; PTH 1361, Neurological Assessment and Adult Neurology; PTH 1366, Neuroanatomy; and PTH 1370, Clinical Seminar.
Quarter 9	PTH 1380, Supervised Clinical Education 1; PTH 1386, Pediatric Neurology; PTH 1391, Cardiopulmonary Rehabilitation in Physical Therapy; PTH 1392, Pathophysiology and Clinical Therapeutics; and PTH 1396, Pediatric Evaluation and Treatment.
Quarter 10	PTH 1426, Functional Assessment of Aging; PTH 1453, Advanced Musculoskeletal Assessment and Treatment; PTH 1405, Research for Physical Therapy; PTH 1411, Clinical Integration; and one elective. Alternate: PTH 1415, Supervised Clinical Education 2.
Quarter 11	Alternate not taken in Quarter 10.
Quarter 12	PTH 1420, Physical Therapy in the Health Care System; PTH 1400, Administration; and two electives.

Toxicology

Robert A. Schatz, PhD, *Associate Professor and Director*

Toxicology examines the adverse effects of chemicals on biologic systems, the conditions under which those effects occur, and the relevant socioeconomic conditions and legal ramifications. The program offers a five-year Bachelor of Science degree that prepares students for work in a variety of specialties.

Forensic toxicology is a hybrid of analytical chemistry and fundamental toxicological principles that focuses on the medical and legal aspects of the harmful effects of chemicals. Biomedical toxicologists are concerned with intoxication by drugs and other chemicals. They are also involved in demonstrating the safety or danger of a drug prior to its release on the market.

Industrial or environmental toxicologists specialize in recognizing, identifying, and quantitating the relative hazards from occupational or public exposure to toxicants. Toxicologists who practice this specialty play a vital role in ensuring the safety of those in the work force or the general public who come into contact with industrial and commercial products.

Numerous federal and local laws aimed at protecting the environment, safeguarding employees in their workplaces, and protecting consumers against hazardous household products have created a critical demand for toxicologists. Job opportunities exist in government, industry, and environmental firms. Many graduates pursue advanced studies.

Bachelor of Science Curriculum

Quarter 1	BIO 1106, General Biology 1; ENG 1110, English 1; MTH 1107, Functions and Basic Calculus; TOX 1100, Toxicology Orientation; and one arts and sciences elective.
Quarter 2	CHM 1111, General Chemistry 1; ENG 1111, Freshman English 2; PHY 1201, Physics 1; and one arts and sciences elective.
Quarter 3	BIO 1107, Animal Biology 2; CHM 1122, Chemistry 2B; MTH 1108, Calculus; and one arts and sciences elective.
Quarter 4	CHM 1264, Organic Chemistry 1; PAH 1202, Anatomy and Physiology 1; PHY 1203, Physics 3; and TOX 1101, Current Topics in Toxicology.
Quarter 5	CHM 1265, Organic Chemistry 2; PAH 1204, Anatomy and Physiology 2; PSY 1211, Statistics in Behavioral Science; and one arts and sciences elective.
Quarter 6	PAH 1280, Biochemistry; PMC 1322, Pharmaceutical Biotechnology; PMC 1419, Medicinal Chemistry/Pharmacology 1; and one arts and sciences elective.
Quarter 7	ENG 1340, Writing Workshop; PCL 1420, Pharmacology/Medicinal Chemistry 2; PCL 1451, Pharmacology Lab; TOX 3121, Environmental Toxicology; and one arts and sciences elective.
Quarter 8	PCL 1422, Pharmacology/Medicinal Chemistry 3; MHP 3200, Risk Assessment; TOX 1301, Fundamental Principles of Systemic Toxicology <i>or</i> one professional elective.

Quarter 9	BIO 1120, Basic Microbiology; BIO 1261, Cell Physiology and Biochemistry; TOX 1300, Clinical Toxicology; TOX 1813, Toxicology Research <i>or</i> one professional elective.
Quarter 10	CHM 1432, Instrumental Analysis <i>or</i> CHM 1461, Identification of Organic Compounds; TOX 1322, Biochemical Toxicology Laboratory; TOX 1811, Toxicology Research; and one arts and sciences elective.
Quarter 11	MLS 4341, Epidemiology; TOX 1302, Chemical and Analytical Toxicology; TOX 1813, Toxicology Research; and one or two arts and sciences electives.

Post-Baccalaureate Certificate Programs

Medical Laboratory Science

The program in medical laboratory science enables students with a baccalaureate degree and sufficient background in the biological and chemical sciences to become eligible for certification in clinical microbiology, chemistry, hematology, immunohematology, or immunology. Depending upon the specialty, students must complete 18 to 23 quarter hours of professional coursework, which must include applied study at an affiliated clinical site. After completing the program, students may be eligible for the national certification examination in a specialty area. Completion requires 12 to 24 months of part-time study depending on prerequisite coursework, specialty chosen, and the timing of a student's entry into the program.

Respiratory Therapy

An accelerated program in respiratory therapy is available for professionals with a baccalaureate or master's degree. The curriculum allows students with the science background needed to master professional courses to integrate didactic, laboratory and clinical practice over a twelve-month period. Graduates of the program are eligible to take the National Board Examination for Registered Respiratory Therapists.

College of Business Administration

Ira R. Weiss, PhD, *Dean*

Roger M. Atherton, Jr., PhD, *Associate Dean for Faculty*

Jay A. Halfond, PhD, *Associate Dean for Administration*

William I. Kelly, MS, *Director, Graduate School of Professional Accounting*

Coleen C. Pantalone, PhD, *Associate Dean for Undergraduate Programs*

Dennis Ramsier, MBA, *Assistant Dean, Undergraduate Programs*

Jonathan B. Welch, PhD, *Associate Dean for Graduate Programs*

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Paul A. Janell, PhD,

Joseph M. Golemme

Professor of Accounting

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Russell W. Olive, DBA

Ira R. Weiss, PhD

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Amitabh Dugar, PhD

James J. Maroney, PhD

Timothy J. Rupert, MS

Marjorie K. Shelley, PhD

Lecturers

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Hugh J. Crossland, LLM

Lynn W. Marples, MBA

Peggy L. O'Kelly, MBA

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Jeffery A. Born, PhD

Donald G. Margotta, PhD

Coleen C. Pantalone, PhD

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Vahan Janjigian, PhD

Mark Kazarosian, PhD

Steven R. Kursh, PhD

Robert M. Mooradian, PhD

Donald Rich, PhD

Harley E. Ryan, Jr., PhD

Carolyn D. Schellhorn, PhD

Emery A. Trahan, PhD

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Peggy L. Fletcher, MBA

General Management Group

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Charles D. Baker, MBA

Robert C. Lieb, DBA

Daniel J. McCarthy, DBA

Ravi Sarathy, PhD

Heidi Vernon-Wortzel, PhD

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Raymond M. Kinnunen, DBA

Marc H. Meyer, PhD

James F. Molloy, Jr., PhD

Carl W. Nelson, PhD

Ravi Ramamurti, DBA

Lecturers

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Joseph W. Chevarley, DBA

James S. Cook, AB

Mary F. Costello, JD

Robert L. Goldberg, MBA

Sumit K. Kundu, PhD

Victor L. Rosenberg, DBA

Robert W. Stuart, PhD

Ronald S. Thomas, PhD

Seymour Tilles, DBA

Human Resources Group

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Cynthia Lee, PhD

Edward F. McDonough III, PhD

Sheila M. Puffer, PhD

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Francis C. Spital, PhD

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Kim R. Kanaga, PhD

Management Science Group**Professors**

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Michael J. Maggard, PhD
Robert A. Millen, PhD

Associate Professors

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Marius M. Solomon, PhD
Eileen M. Trauth, PhD
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Bruce H. Clark, PhD
Lynn J. Jaffe, DBA
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E. Craig Stacey, PhD

Programs in the College of Business Administration are designed for students who are preparing to take on managerial responsibility. These programs help students develop the ability to recognize and solve business and organizational problems and understand the role of business in the community, the nation, and the world.

The college's goal is to help students develop ideals that are ethically sound and socially desirable; cultivate an awareness of the social, political, and economic developments to which businesses must adapt; develop sound judgment and effective communication skills; and develop their individual interests and talents.

Modern business faces many challenges from unprecedented political change and the effects of foreign policy, high technology, affirmative-action regulations, and new economic policies. These challenges have increased the demand for highly trained individuals equipped to analyze and address our economy's complex social and legal problems.

The college offers a Bachelor of Science degree in international business and in business administration with concentrations in accounting, entrepreneurship and small business management, finance and insurance, human resources management, international business, logistics and transportation, management, management information systems, and marketing. The business curriculum is enhanced by courses in the sciences, humanities, and social sciences. In addition to their academic courses, all students are required to complete a five-year or a four-year cooperative education plan.

Co-op provides a learning experience beyond the classroom. Textbook examples come to life in real-world business settings. Classroom theories are applied to actual business problems. In turn, these experiences serve to stimulate inquiry and discussion back in the classroom. This interaction between college studies and cooperative education sets the stage for a lifetime of learning.

The undergraduate program of the College of Business Administration meets the standards of the American Assembly of Collegiate Schools of Business for faculty and student quality, curriculum design, and overall University support.

Business majors go on to graduate work in business as well as public health-care and education administration. Many careers in law also require an understanding of business concepts. Although the Association of American Law Schools does not recommend particular courses for prelegal students, it does advise undergraduates to develop critical understanding of the institutions and values with which the law deals.

Class Entrance Requirements

Listed below are the quality-point averages required for students to advance to the next class year and to graduate.

	Overall QPA	Freshman Core Courses QPA*	Business Courses QPA
Sophomore	1.4	1.8	1.8
Middler	1.9		1.9
Junior	2.0		2.0
Senior	2.0		2.0
To graduate	2.0		2.0

*Freshman Core Courses refers to Freshman English I and II, Macro and Micro Economics, Calculus for Business, and Introduction to Business.

Graduation Requirements

Bachelor of Science degree candidates must complete all prescribed work of the curriculum in which they seek to qualify, currently 176 quarter hours. The degree not only represents the formal completion of selected courses, but also indicates professional study in the major or concentration. A quality-point average of C (2.0) and a C average in all business courses are required for graduation.

Minor in Business Administration

Students must be enrolled in a full program of studies in the College of Business Administration during the final three quarters preceding graduation.

All courses in the College of Business Administration are available to all nonbusiness students at Northeastern University if they meet the class standing and course requirements. Nonbusiness students may find the minor attractive if they are considering a career in business or pursuing an MBA. The minor consists of eight courses. Students who wish to enter the program should speak with an adviser in the Undergraduate Business Programs Office upon successful completion of at least the macro economics and college algebra courses. Students who complete all eight courses successfully and have earned at least a C (2.0) average in them will be awarded a minor in Business Administration at graduation.

Minor Curriculum

Background courses: MTH 1101, Applications of Algebra *or* MTH 1106, Functions and Algebra *or* MTH 1113, College Math for Business and Economics *or* better; ECN 1115, Principles of Macroeconomics.

Required courses: MGT 1115, Introduction to Business; ACC 1111, Accounting Principles 1; HRM 1432, Organizational Behavior *or* HRM 1431, Complex Organizations; FIN 1438, Principles of Finance 1; MKT 1435, Introduction to Marketing. Plus one of the following: MGT 1450, Business Policy; ENT 1330, Entrepreneurship; INB 1338, Introduction to International Business; MSC 1441, Operations Management.

Certificate programs. The College offers a number of certificate programs which recognize a business or nonbusiness student's acquired expertise in specified areas of specialization.

Five-Year Bachelor of Science Curriculum for First Three Quarters

The courses taken in the first three quarters of the five-year program are the same for all concentrations.

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| Quarter 1 | ECN 1115, Principles of Macroeconomics; ENG 1110, Freshman English 1; and two arts and sciences electives. |
| Quarter 2 | MGT 1115, Introduction to Business; MTH 1114, Calculus for Business; and two arts and sciences electives. |
| Quarter 3 | ECN 1116, Principles of Microeconomics; ENG 1111, Freshman English 2; and two arts and sciences electives. |

Four-Year Bachelor of Science Curriculum for First Five Quarters

The courses taken in the first five quarters of the four-year program are the same for all concentrations.

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| Quarter 1 | MGT 1115, Introduction to Business; non-business elective <i>or</i> MTH 1113, Mathematics for Business and Economics; ENG 1110, Freshman English 1, and a non-business elective. |
| Quarter 2 | ECN 1115, Principles of Macroeconomics; MTH 1114, Calculus for Business; and two non-business electives. |
| Quarter 3 | ECN 1116, Principles of Microeconomics; ENG 1111, Freshman English 2; and three non-business electives. |
| Quarter 4 | ACC 1111, Accounting Principles 1; MSC 1200, Business Statistics 1; MSC 1226, Computer Based Information Systems; and a non-business elective. |
| Quarter 5 | ACC 1112, Accounting Principles 2; MSC 1201, Business Statistics 2; ENG 1381, Writing for the Professions: Business Administration; and two non-business electives. |

Accounting

A concentration in accounting prepares the graduate for entry into one of the fastest growing and most critical areas of management. Accounting is an exacting field that requires accuracy, the ability to reason, and the skills to interpret business data and to deal with people. Accountants hold sensitive management positions in private firms in business or industry, public accounting firms, and governmental agencies.

To prepare for an accounting career, students take courses in financial and managerial reporting, systems design and installation, taxation, and auditing. Elective courses are available for more specialized study in cost accounting, accounting theory, planning and control, auditing, and taxes.

Students may also count up to eighteen months of cooperative education experience in auditing toward the three years required to become a Certified Public Accountant.

Five-Year Bachelor of Science Curriculum

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| Quarters 1–3 | See above. |
| Quarter 4 | ACC 1111, Accounting Principles 1; MSC 1200, Business Statistics 1; MSC 1226, Computer-Based Information Systems; and one nonbusiness elective. |

Four-Year Bachelor of Science Curriculum	Quarter 5	ACC 1112, Accounting Principles 2; MSC 1201, Business Statistics 2; a nonbusiness elective; and an open elective.
	Quarter 6	ACC 1331, Intermediate Accounting 1; FIN 1438, Principles of Finance 1; and HRM 1433, Organizational Behavior and Design.
	Quarter 7	ACC 1332, Intermediate Accounting 2; ACC 1339, Cost Accounting; FIN 1439, Principles of Finance 2; and MKT 1435, Introduction to Marketing.
	Quarter 8	ACC 1343, Intermediate Accounting 3; ACC 1345, Accounting Systems; MSC 1441, Operations Management; and one nonbusiness elective.
	Quarter 9	ACC 1347, Auditing; MSC 1433, Quantitative Models in Business; MGT 1446, Managing Social Issues; and upper division writing requirement.
	Quarter 10	ACC 1351, Federal Income Tax 1; MGT 1450, Business Policy; and two open electives.
	Quarter 11	Three open electives and a nonbusiness elective.
	Quarters 1–5	See page 79.
	Quarter 6	ACC 1331, Intermediate Accounting 1; ACC 1339, Cost Accounting; FIN 1438, Principles of Finance 1; MSC 1441, Operations Management.
	Quarter 7	ACC 1332, Intermediate Accounting 2; MKT 1435, Introduction to Marketing; FIN 1439, Principles of Finance 2; HRM 1433, Organizational Behavior and Design.
	Quarter 8	ACC 1343, Intermediate Accounting 3; MGT 1446, Managing Social Issues; MSC 1433, Quantitative Models in Business; and an open elective.
	Quarter 9	ACC 1351, Federal Income Tax 1; MGT 1450, Business Policy; ACC 1345, Accounting Systems; and two open electives.
	Quarter 10	ACC 1347, Auditing; and three open electives.

Entrepreneurship and Small Business Management

The concentration in entrepreneurship and small business management helps students develop the skills needed to work effectively within a small business or to start or acquire and manage their own.

Students learn to assess their personal aptitude and potential for small business; find and evaluate business opportunities; secure essential funding; and organize and manage such functional business areas as manufacturing, marketing, accounting, and finance. They will learn these important skills by taking courses in entrepreneurship, starting and managing new businesses, small business finance, and planning and growing new ventures.

This concentration also helps students prepare for careers in sales management, banking, public accounting, and other areas relevant to the small business environment.

During their senior year, students participate in the Small Business Institute Field Project. Offered in conjunction with the United States Small Business Administration, this unique course offers students the chance to work, under faculty guidance, as consultants to small business owners; students analyze company needs and help develop practical solutions to actual management problems.

Five-Year Bachelor of Science Curriculum

Quarters 1–3	See page 79.
Quarter 4	ACC 1111, Accounting Principles 1; MSC 1200, Business Statistics 1; MSC 1226, Computer-Based Information Systems; and one nonbusiness elective.
Quarter 5	ACC 1112, Accounting Principles 2; MSC 1201, Business Statistics 2; and two nonbusiness electives.
Quarter 6	ENT 1330, Management of Smaller Enterprises; FIN 1438, Principles of Finance 1; MKT 1435, Introduction to Marketing; and an open elective.
Quarter 7	FIN 1439, Principles of Finance 2; HRM 1433, Organizational Behavior and Design; and MSC 1433, Quantitative Models in Business.
Quarter 8	ENT 1344, Opportunity Analysis and Venture Capital; a nonbusiness elective; an open elective; and upper division writing requirement.
Quarter 9	FIN 1770, Small Business Finance; MGT 1446, Managing Social Issues; MSC 1441, Operations Management; and an open elective.
Quarter 10	MGT 1450, Business Policy; ENT 1352, New Venture Creation; and two open electives.
Quarter 11	ENT 1358, Small Business Institute Field Project; and two open electives.
Quarters 1–5	See page 79.
Quarter 6	MKT 1435, Introduction to Marketing; FIN 1438, Principles of Finance 1; MSC 1441, Operations Management; and one open elective.

Four-Year Bachelor of Science Curriculum

Quarter 7	ENT 1330, Small Business Management; FIN 1439, Principles of Finance 2; HRM 1433, Organizational Behavior and Design; and one open elective.
Quarter 8	FIN 1770, Small Business Finance; MGT 1446, Managing Social Issues; ENT 1344, Opportunity Analysis and Venture Capital; MSC 1433, Quantitative Models in Business.
Quarter 9	MGT 1450, Business Policy; and four open electives.
Quarter 10	ENT 1352, New Venture Creation; ENT 1358, Small Business Institute Project; and an open elective.

Finance and Insurance

The role of people trained in finance and insurance is expanding rapidly within the business world. Changes on the financial scene—rising securities prices, fluctuating inflation and interest rates, and scarcity of capital—have created an awareness that financial knowledge is essential to the effective management of business firms.

Finance is the management and investment of money and other assets for business, financial institutions, nonprofit organizations, governments, and individuals.

The program draws on accounting principles, economic theory, and quantitative methods to direct the way money is managed, acquired, and distributed. Students learn how economic systems operate and how money markets work within economic systems. They also learn to analyze economic trends and indications and to examine the movement and distribution of money.

Students may specialize in one or more of the following areas: management finance, investment management and analysis, management of financial institutions, insurance and risk management, real estate, and financial planning. The program prepares students for careers in financial management, security analysis, investment management, security or insurance brokerage, underwriting, credit management, and risk management with corporations, commerce banks, insurance companies, and other financial institutions.

Five-Year Bachelor of Science Curriculum

Quarters 1–3	See page 79.
Quarter 4	ACC 1111, Accounting Principles 1; MSC 1200, Business Statistics 1; and two nonbusiness electives.
Quarter 5	ACC 1112, Accounting Principles 2; MSC 1201, Business Statistics 2; MSC 1226, Computer-Based Information Systems; and a nonbusiness elective.
Quarter 6	FIN 1438, Principles of Finance 1; FIN 1333, Financial Institutions and Markets; MKT 1435, Introduction to Marketing; and a nonbusiness elective.
Quarter 7	FIN 1439, Principles of Finance 2; HRM 1433, Organizational Behavior and Design; and MSC 1433, Quantitative Models in Business.
Quarter 8	FIN 1335, Managerial Finance; FIN 1346, Investment Management; upper-division writing requirement; and an open elective.
Quarter 9	MSC 1441, Operations Management; MGT 1446, Managing Social Issues; finance elective; and an open elective.
Quarter 10	MGT 1450, Business Policy; finance elective; and two open electives.
Quarter 11	Finance elective and three open electives.

Four-Year Bachelor of Science Curriculum

Quarters 1–5	See page 79.
Quarter 6	FIN 1438, Principles of Finance 1; FIN 1333, Financial Institutions and Markets; MSC 1441, Operations Management; and one open elective.
Quarter 7	FIN 1439, Principles of Finance 2, MKT 1435, Introduction to Marketing; HRM 1433, Organizational Behavior and Design; and one open elective.
Quarter 8	FIN 1335, Managerial Finance; MGT 1446, Managing Social Issues; MSC 1433, Quantitative Models in Business; and one open elective.
Quarter 9	FIN 1346, Investment Management; MGT 1450, Business Policy; one finance elective; and two open electives.
Quarter 10	Two finance electives and two open electives.

Human Resources Management

Human resources management (HRM) focuses on the effective utilization of people at work. Traditionally, the major areas of HRM include employee relations, recruitment, selection, compensation, and training. Although expertise in these areas is necessary, major changes in the field have led to a more strategic role for the human resources professional. Today, human resource managers must be skilled in job and organizational design, innovative career planning, and leading effective internal change.

The successful management of human resources calls for a partnership among human resources professionals, labor relations negotiators, wage and salary analysts, and operating line managers in a company's functional areas (marketing, finance, and production). With the challenges brought about by an increasingly diverse work force and rapid international expansion, however, the importance of HRM has increased dramatically in recent years. HRM professionals now oversee organizational compliance with equal-opportunity laws, institute affirmative action procedures, and design or manage participative work systems.

Coursework focuses on a wide range of issues that affect human resources management: labor issues, negotiating strategies, psychological principles underlying organizational and human behavior, job enrichment, and organizational development activities.

Five-Year Bachelor of Science Curriculum

Quarters 1–3	See page 79.
Quarter 4	ACC 1111, Accounting Principles 1; MSC 1200, Business Statistics 1; MSC 1226, Computer-Based Information Systems; and one nonbusiness elective.
Quarter 5	ACC 1112, Accounting Principles 2; MSC 1201, Business Statistics 2; and two nonbusiness electives.
Quarter 6	FIN 1438, Principles of Finance 1; HRM 1433, Organizational Behavior and Design; and MSC 1433, Quantitative Models in Business.
Quarter 7	FIN 1439, Principles of Finance 2; HRM 1332, Introduction to Human Resource Management; MKT 1435, Introduction to Marketing; and an open elective.
Quarter 8	HRM 1348, Reward Systems; HRM 1349, Assessment of Prospective Employees; MSC 1441, Operations Management; and an open elective.
Quarter 9	MGT 1446, Managing Social Issues; human resources management elective; upper division writing requirement; and an open elective.
Quarter 10	HRM 1345, Contemporary Labor Issues; MGT 1450, Business Policy; human resources management elective; and an open elective.
Quarter 11	Nonbusiness elective and three open electives.

Four-Year Bachelor of Science Curriculum

Quarters 1–5	See page 79.
Quarter 6	FIN 1438, Principles of Finance 1; MSC 1441, Operations Management; HRM 1433, Organizational Behavior and Design.
Quarter 7	HRM 1332, Introduction to Human Resource Management; FIN 1439, Principles of Finance 2; MKT 1435, Introduction to Marketing; and two open electives.
Quarter 8	HRM 1345, Contemporary Labor Issues; MSC 1433, Quantitative Models in Business; MGT 1446, Managing Social Issues; and one HRM elective.
Quarter 9	HRM 1348, Reward Systems; HRM 1349, Selection and Assessment; MGT 1450, Business Policy; and two open electives.
Quarter 10	Human resources management elective and three open electives.

International Business Administration

The recent growth of multinational firms, international trade, and regional international trading blocs has created a shortage of skilled managers who are equipped to analyze the complexities of international business.

The international business administration concentration fosters an understanding of problems involved in operating businesses across national boundaries and analyzes the operations of businesses in multinational environments.

It is increasingly common for multinational firms to require that candidates for top management positions have prior experience in international operations. In addition, large banks and insurance companies, governments, trade associations, and transnational bodies also have a growing need for managers who understand international business issues.

The concentration in international business administration includes broad-based courses dealing with the international environment as well as functional business courses with an international focus. Some of these courses are offered by the College of Business Administration; those in the

humanities and social sciences are offered by the College of Arts and Sciences. All courses in the international business administration concentration are available to students in other concentrations during their middler, junior, and senior years.

Since most careers in international business begin in a functional area that has an international component, students are encouraged to complete a dual concentration. For example, students may combine a concentration in international business administration with one in finance, marketing, accounting, or human resources management. Students are also encouraged to develop competency in a foreign language, a skill viewed as a major asset by many prospective employers.

The College of Business Administration has extensive international contacts that enable many students to participate in international cooperative work experiences or internships.

Five-Year Bachelor of Science Curriculum

Quarters 1–3	See page 79.
Quarter 4	ACC 1111, Accounting Principles 1; MSC 1200, Business Statistics 1; and two nonbusiness electives.
Quarter 5	ACC 1112, Accounting Principles 2; MSC 1201, Business Statistics 2; MSC 1226, Computer-Based Information Systems; and one open elective.
Quarter 6	FIN 1438, Principles of Finance 1; HRM 1433, Organizational Behavior and Design; and INB 1338, Introduction to International Business.
Quarter 7	FIN 1439, Principles of Finance 2; MKT 1435, Introduction to Marketing; and MSC 1433, Quantitative Models in Business; and an open elective.
Quarter 8	MSC 1441, Operations Management; a business elective; an international nonbusiness elective; and an open elective.
Quarter 9	FIN 1759, International Financial Markets; MGT 1446, Managing Social Issues; upper division writing requirement; and an international business elective.
Quarter 10	MGT 1450, Business Policy; an international nonbusiness elective; and two open electives.
Quarter 11	INB 1352, Seminar in International Business; an international business elective; and two open electives.

Four-Year Bachelor of Science Curriculum

Quarters 1–5	See page 79.
Quarter 6	INB 1338, Introduction to International Business; FIN 1438, Principles of Finance 1; MKT 1435, Introduction to Marketing; MSC 1441, Operations Management.
Quarter 7	FIN 1439, Principles of Finance 2; HRM 1433, Organizational Behavior and Design; and two open electives.
Quarter 8	MGT 1446, Managing Social Issues; MSC 1433, Quantitative Models in Business; one IB elective; and one open elective.
Quarter 9	FIN 1759, International Financial Markets; MGT 1450, Business Policy; one business elective; and two open electives.
Quarter 10	INB 1352, Seminar in International Business; one IB elective; and two open electives.

Logistics and Transportation

From the Fortune 500 manufacturer to the small retail firm that produces, sells, or distributes products, all companies have a logistics function that must be effectively managed if they are to be competitive. A logistics manager is typically involved in making critical decisions about such matters as the modes of transportation used to move the company's materials and products, inventory policies, warehousing needs, and the location of facilities.

As American corporations become increasingly involved in global markets, logistics managers play a major role not only in assessing the feasibility of international activity, but also in developing distribution networks to support that involvement. Logistics management is one of the most rapidly expanding areas of business.

The academic work in the program flows from introductory courses in transportation through advanced study in physical distribution management. Electives then provide in-depth examinations of how goods and services reach their destinations. The program culminates in a senior seminar. Courses address not only the viewpoints of corporate shippers and carriers, but also those of public officials and consumer advocates.

Logistics and transportation managers frequently interact with managers from other functional areas; it is useful for a student therefore to complete a dual concentration in finance, marketing, or another functional area.

In addition to corporations, companies (carriers) that sell transportation services offer rewarding career opportunities. The nation's carriers, including the airlines, railroads, trucking companies, and urban transit systems, increasingly rely on individuals who are skilled in logistics and transportation management.

Students interested in public policy and administration may pursue careers with the federal, state, and local government agencies involved in the financing and the economic and safety regulation of the transportation infrastructure.

Five-Year Bachelor of Science Curriculum

Quarters 1–3	See page 79.
Quarter 4	ACC 1111, Accounting Principles 1; MSC 1200, Business Statistics 1; and two nonbusiness electives.
Quarter 5	ACC 1112, Accounting Principles 2; MSC 1201, Business Statistics 2; MSC 1226, Computer-Based Information Systems; and a nonbusiness elective.
Quarter 6	FIN 1438, Principles of Finance 1; HRM 1433, Organizational Behavior and Design; and TRN 1333, The Domestic Transportation System.
Quarter 7	FIN 1439, Principles of Finance 2; a transportation elective; MKT 1435, Introduction to Marketing; and MSC 1433, Quantitative Models in Business.
Quarter 8	MSC 1441, Operations Management; a transportation elective; a nonbusiness elective; and an open elective.
Quarter 9	MGT 1446, Managing Social Issues; TRN 1344, Corporate Transportation/Logistics; an open elective; and an upper division writing requirement.
Quarter 10	MGT 1450, Business Policy; a transportation elective; and two open electives.
Quarter 11	TRN 1353, Seminar in Transportation; and three open electives.

Four-Year Bachelor of Science Curriculum

Quarters 1–5	See page 79.
Quarter 6	TRN 1333, Domestic Transportation System; FIN 1438, Principles of Finance 1; MKT 1435, Introduction to Marketing; MSC 1441, Operations Management.
Quarter 7	FIN 1439, Principles of Finance 1; HRM 1433, Organizational Behavior and Design; one TRN elective; and one open elective.
Quarter 8	MGT 1446, Managing Social Issues; MSC 1433, Quantitative Models in Business; and two open electives.
Quarter 9	MGT 1450, Business Policy; TRN 1344, Business/Logistics; one TRN elective; and two open electives.
Quarter 10	TRN 1353, Seminar in Transportation and Logistics; one TRN elective; and two open electives.

Management

The concentration in management is designed for the student with a strong interest in motivating people to provide goods and services creatively and productively.

The program helps students understand the various aspects of administrative practice and develop judgment and skills in organizational problem analysis and decision making. It focuses on three functional areas—marketing, finance, and operations—and explores the interrelation of these areas and the ways they can be used as management tools. To these are added the perspectives of law, accounting, and management information systems. Finally, the concentration includes several courses on business policy that are intended to develop skills in both the integrative and strategic roles of management.

Through extensive use of case studies, management simulations, and group research projects, students develop leadership skills. Faculty pay significant attention to “people problems” in order to stress the importance of developing an effective work force.

Five-Year Bachelor of Science Curriculum

Quarters 1–3	See page 79.
Quarter 4	ACC 1111, Accounting Principles 1; MSC 1200, Business Statistics 1; and two nonbusiness electives.
Quarter 5	ACC 1112, Accounting Principles 2; MSC 1201, Business Statistics 2; MSC 1226, Computer-Based Information Services; and a nonbusiness elective.
Quarter 6	FIN 1438, Principles of Finance 1; HRM 1433, Organizational Behavior and Design; and MSC 1433, Quantitative Models in Business.

Four-Year Bachelor of Science Curriculum	Quarter 7	ACC 1330, Cost Accounting; FIN 1439, Principles of Finance 2; MKT 1331, Marketing Management; and MKT 1435, Introduction to Marketing.
	Quarter 8	MGT 1345, Legal Aspects of Business; MSC 1441, Operations Management; a business elective; and an open elective.
	Quarter 9	MGT 1446, Managing Social Issues; a business elective; an open elective; and upper division writing requirement.
	Quarter 10	MGT 1450, Business Policy; a nonbusiness elective; and two open electives.
	Quarter 11	Business elective and three open electives.
	Quarters 1–5	See page 79.
	Quarter 6	FIN 1438, Principles of Finance 1; MKT 1435, Introduction to Marketing; MSC 1441, Operations Management; and one business elective.
	Quarter 7	MKT 1331, Marketing Management; FIN 1439, Principles of Finance 2; HRM 1433, Organizational Behavior and Design; and one open elective.
	Quarter 8	MGT 1446, Managing Social Issues; MSC 1433, Quantitative Models in Business; and two open electives.
	Quarter 9	MSC 1341, Information Resource Management; MGT 1450, Business Policy; MGT 1345, Legal Aspects of Business; and two open electives.
	Quarter 10	HRM 1350, Strategic Management of Human Resources; MGT 1350, Advanced Strategic Management; and two open electives.

Management Information Systems

The concentration in management information systems (MIS) is designed to teach tomorrow's managers how to derive the maximum benefit from state-of-the-art information technology.

The program provides a background in two distinct tracks. The first builds on the historical development of large and powerful computers that carry out organization-wide tasks, such as database management. The second track, often referred to as "end-user computing," deals with the direct linkage of decision makers and user-friendly computer facilities.

Through an in-depth examination of case studies, the capstone senior year course, Business Systems Integration, illustrates how management information technology is used to identify and solve an organization's information-related problems.

MIS managers interact frequently with other managers throughout an organization; therefore students are encouraged to complete a dual concentration in one of the functional areas of management.

Five-Year Bachelor of Science Curriculum	Quarters 1–3	See page 79.
	Quarter 4	ACC 1111, Accounting Principles 1; MSC 1200, Business Statistics 1; and two nonbusiness electives.
	Quarter 5	ACC 1112, Accounting Principles 2; MSC 1201, Business Statistics 2; MSC 1226, Computer-Based Information Systems; and one open elective.
	Quarter 6	FIN 1438, Principles of Finance 1; HRM 1433, Organizational Behavior and Design; and an open elective.
	Quarter 7	FIN 1439, Principles of Finance 2; MKT 1435, Introduction to Marketing; MSC 1335, Telecommunications and Networks; and MSC 1433, Quantitative Models in Business.
	Quarter 8	MSC 1441, Operations Management; MSC 1330, Data Management; MSC 1332, Decision Support Systems for Business; and a nonbusiness elective.
	Quarter 9	MGT 1446, Managing Social Issues; MSC 1336, Business Programming; upper division writing requirement; and a nonbusiness elective.
	Quarter 10	MGT 1450, Business Policy; MSC 1350, Database Management Systems; MSC 1341, Information Resource Management; and one open elective.
	Quarter 11	MSC 1342, Business Systems Integration; and three open electives.
	Quarters 1–5	See page 79.
Four-Year Bachelor of Science Curriculum	Quarter 6	MSC 1335, Telecommunications and Networks; FIN 1438, Principles of Finance 1; MKT 1435, Introduction to Marketing; MSC 1441, Operations Management.

Quarter 7	MSC 1336, Business Programming; FIN 1439, Principles of Finance 2; HRM 1433, Organizational Behavior and Design; and one open elective.
Quarter 8	MSC 1341, Information Resource Management; MSC 1433, Quantitative Models in Business; MGT 1446, Managing Social Issues; and one open elective.
Quarter 9	MSC 1330, Data Management; MGT 1450, Business Policy; MSC 1332, Business Support Systems for Business; and two open electives.
Quarter 10	MSC 1342, Business Systems Integration; and three open electives.

Marketing

A business not only designs and manufactures products, but also markets and sells them to manufacturers, wholesalers, retailers, and consumers. All the activities that direct the flow of goods and services from producer to consumer are classified as marketing concerns. Once an organization determines a customer's needs and wants, its first objective is to produce goods or services to satisfy that particular consumer. Essential in all types of businesses are product design, research, pricing, packaging, transportation, advertising, selling, and servicing.

The concentration in marketing is designed to familiarize students with the marketing process and to provide them with the theoretical concepts, skills, and tools necessary to successfully enter and advance in one of the many possible career paths. Students learn to evaluate consumer behavior, employ advertising principles, utilize market research and testing, and develop ways to position products and services in a favorable light. They also explore the changing economic, political, legal, ethical, and cultural contexts in which marketing strategies must be developed.

Students may select courses that lead to one of many career paths within marketing: product or brand management, marketing research, advertising management, retail management, sales management, or international marketing management.

Five-Year Bachelor of Science Curriculum

Quarters 1–3	See page 79.
Quarter 4	ACC 1111, Accounting Principles 1; MSC 1200, Business Statistics 1; MSC 1226, Computer-Based Information Systems; and a nonbusiness elective.
Quarter 5	ACC 1112, Accounting Principles 2; MSC 1201, Business Statistics 2; and two nonbusiness electives.
Quarter 6	FIN 1438, Principles of Finance 1; MKT 1435, Introduction to Marketing; MSC 1433, Quantitative Models in Business; and a nonbusiness elective.
Quarter 7	FIN 1439, Principles of Finance 2; HRM 1433, Organizational Behavior and Design; and MKT 1331, Marketing Management.
Quarter 8	MKT 1341, Marketing Research; a marketing elective; an open elective; and upper division writing requirement.
Quarter 9	MGT 1446, Managing Social Issues; MSC 1441, Operations Management; a marketing elective; and an open elective.
Quarter 10	MKT 1351, Competitive Strategy; MGT 1450, Business Policy; and two open electives.
Quarter 11	Marketing elective and three open electives.

Four-Year Bachelor of Science Curriculum

Quarters 1–5	See page 79.
Quarter 6	MKT 1435, Introduction to Marketing; FIN 1438, Principles of Finance 1; MSC 1441, Operations Management; and one open elective.
Quarter 7	MKT 1331, Marketing Management; FIN 1439, Principles of Finance 2; HRM 1433, Organizational Behavior and Design; and one open elective.
Quarter 8	MKT 1341, Marketing Research; MGT 1446, Managing Social Issues; MSC 1433, Quantitative Models in Business; and one MKT elective.
Quarter 9	MKT 1351, Competitive Strategy; MGT 1450, Business Policy; one MKT elective; and two open electives.
Quarter 10	Marketing elective and three open electives.

International Business

Bachelor of Science in International Business

The College of Business Administration is offering a new and innovative degree program, the Bachelor of Science in international business. This program, the first of its kind in the United States, is for the highly motivated student who plans a career in import/export, international finance or manufacturing, or other areas that involve global markets.

Students are admitted to a French, Spanish, or German track. They develop fluency in their chosen language and study the culture of the country or countries where that language is spoken. In addition, they participate in at least one cooperative education work experience or internship abroad in order to sharpen their language and business skills.

All students in the Bachelor of Science in International Business degree program must take the required courses in the international business administration concentration (see page 82) and are encouraged to develop skills in other business areas such as finance, marketing, management, or human resources.

College of Computer Science

Larry A. Finkelstein, PhD, *Dean*

Agnes H. Chan, PhD, *Associate Dean and Director of Graduate Studies*

Richard A. Rasala, PhD, *Associate Dean and Director of Undergraduate Studies*

Marie P. Hinds, BS, *Assistant to the Dean*

Professors

Agnes H. Chan, PhD
Gene D. Cooperman, PhD
Harriet J. Fell, PhD
Larry A. Finkelstein, PhD
Karl J. Lieberherr, PhD
Richard A. Rasala, PhD
Betty J. Salzberg, PhD
Raoul N. Smith, PhD
Mitchell Wand, PhD
Patrick S. P. Wang, PhD

Joint Professor

R. Mark Goresky, PhD
Mathematics

Associate Professors

Kenneth P. Baclawski, PhD
John Casey, BA
William D. Clinger, PhD
Robert P. Futrelle, PhD
Carole D. Hafner, PhD
Viera K. Proulx, PhD
Ronald J. Williams, PhD
Bryant W. York, PhD

Assistant Professor

Boaz Patt-Shamir, PhD

The invention of powerful computers and the development of complex software programs have fundamentally transformed the way people work and live. Computers are now essential tools in business, industry, science, medicine, and human services. Computers also enhance the efforts of individuals and volunteer groups to meet their goals. In addition, the most sophisticated work in music, film, and video often makes use of computer technology. The College of Computer Science believes that computing is one of the most exciting fields of study and that its applications are limitless.

In the College of Computer Science, students learn about the principles and practices which support the development of high quality software. Computer science as a discipline draws its inspiration from many fields: mathematics, science, engineering, and art. From mathematics, students learn to think logically and to build complex structures from simple and secure components. From the experimental sciences, students learn to estimate the performance of algorithms and then test these estimates in real life. From engineering, students learn to treat program design as a complicated set of tradeoffs between computer resources (execution time, memory needs, peripherals), programmer resources (development time and available software tools), and customer needs (what must be done and how soon). Finally, from art, students learn to value the beauty of the internal program code as well as the quality of the external user interface. The College of Computer Science trains its students to understand and practice the diverse skills that are needed to make a significant contribution to the field of computing.

The undergraduate program in the College of Computer Science treats a variety of subject areas in computing, such as algorithms, data structures, programming language design, compilers, computer architecture, operating systems, database systems, graphics, artificial intelligence, and parallel computing. Qualified students may choose electives from a wide range of more advanced graduate courses. Students may also work individually with professors on research projects or may volunteer with the systems staff in order to enhance their technical experience.

The college offers two undergraduate degrees. The Bachelor of Science emphasizes strong technical competence in computer science, mathematics, physics, and electrical engineering. The Bachelor of Arts combines a computer science major with a broad-based liberal arts education. The Bachelor of Science program is accredited by the Computer Science Accreditation Board.

Normally, the undergraduate degree program is five years, including seven quarters of on-the-job cooperative education in industry. Students may complete the program in four years with a reduced cooperative education component. Because the experience acquired in industry can contribute tremendously to a student's academic and personal development, the college is strongly committed to the principle of cooperative education.

Class Entrance Requirements

The minimum overall quality-point averages listed are required for students to advance to the next rank and to graduate.

Sophomore	1.7
Middler	1.9
Junior	2.0
Senior	2.0
To graduate	2.0

In addition, a minimum quality-point average of 2.0 in all computer science courses (any course number with a COM prefix) is required for graduation. For additional information, consult the *College of Computer Science Undergraduate Student Guidebook*.

Minor in Computer Science

This minor is particularly valuable to non-computer science students seeking positions where a familiarity with computer science concepts and techniques is desirable. Four required level-one courses must be completed, plus three additional computer science courses elected from a number of courses specified by the college. Details may be obtained from the dean's office.

Five-Year Bachelor of Science Curriculum

Quarter 1	COM 1100, Fundamentals of Computer Science; COM 1121, Computer Science Overview 1; ENG 1110, Freshman English 1; MTH 1123, Calculus 1; and one basic social science.
Quarter 2	COM 1101, Algorithms and Data Structures 1; COM 1122, Computer Science Overview 2; MTH 1124, Calculus 2; MTH 1137, Discrete Mathematics 1; and one basic social science.
Quarter 3	COM 1114, C Lab; COM 1201, Algorithms and Data Structures 2; ENG 1111, Freshman English 2; MTH 1125, Calculus 3; and one sub-area or general elective.
Quarter 4	COM 1130, Computer Organization and Design; MTH 1223, Calculus 4; PHY 1221, Physics 1; PHY 1521, Physics 1 Lab; and one sub-area or general elective.
Quarter 5	COM 1110, FORTRAN Lab; COM 1204, Object-Oriented Design; ECE 1178, Digital Electronics for Computer Science; PHY 1222, Physics 2; PHY 1522, Physics 2 Lab; and MTH 1240, Chaos and Fractals.
Quarter 6	COM 1330, Operating Systems Concepts; ECE 1229, Digital Systems Lab; ECE 1382, Computer Engineering 2; PHY 1223, Physics 3; and one sub-area or general elective.
Quarter 7	COM 1102, Functional Programming and Applications; COM 1350, Automata and Formal Language; ENG 1125, Technical Writing 1; and one sub-area or general elective.
Quarter 8	COM 1205, Software Design; MTH 1301, Linear Algebra 1; SOC 1485, Computers and Society; and one computer science elective.
Quarter 9	MTH 1387, Probability 1; two computer science electives; and one sub-area or general elective.
Quarter 10	COM 1390, Algorithms; one computer science elective; and two sub-area or general electives.
Quarter 11	COM 1621, Computer Science Seminar; one computer science elective; and three sub-area or general electives.

Four-Year Bachelor of Science Curriculum

Quarter 1	COM 1100, Fundamentals of Computer Science; COM 1121, Computer Science Overview 1; ENG 1110, Freshman English 1; MTH 1123, Calculus 1; and one basic social science.
Quarter 2	COM 1101, Algorithms and Data Structures 1; COM 1122, Computer Science Overview 2; MTH 1124, Calculus 2; MTH 1137, Discrete Mathematics 1; and one basic social science.
Quarter 3	COM 1114, C Lab; COM 1201, Algorithms and Data Structures 2; ENG 1111, Freshman English 2; MTH 1125, Calculus 3; and one sub-area or general elective.
Quarter 4	COM 1130, Computer Organization and Design; MTH 1223, Calculus 4; PHY 1221, Physics 1; PHY 1521, Physics 1 Lab; and one sub-area or general elective.
Quarter 5	COM 1204, Object-Oriented Design; ECE 1178, Digital Electronics for Computer Science; PHY 1222, Physics 2; PHY 1522, Physics 2 Lab; and MTH 1240, Chaos and Fractals.
Quarter 6	COM 1110, FORTRAN Lab; COM 1350, Automata and Formal Language; MTH 1387, Probability; and two sub-area or general electives.
Quarter 7	COM 1330, Operating Systems Concepts; ECE 1229, Digital Systems Lab; ECE 1382, Computer Engineering 2; PHY 1223, Physics 3; and one sub-area or general elective.

	Quarter 8	COM 1102, Functional Programming and Applications; ENG 1125, Technical Writing 1; one sub-area or general elective; and one computer science elective.
	Quarter 9	MTH 1301, Linear Algebra; two computer science electives; and one sub-area or general elective.
	Quarter 10	COM 1205, Software Design and Development; COM 1390, Algorithms; SOC 1485, Computers and Society; and one sub-area or general elective.
	Quarter 11	COM 1621, Senior Seminar; two computer science electives; and two sub-area or general electives.
	Quarter 1	COM 1100, Fundamentals of Computer Science; COM 1121, Computer Science Overview 1; ENG 1110, Freshman English 1; MTH 1123, Calculus 1; and one arts and sciences core course.
	Quarter 2	COM 1101, Algorithms and Data Structures 1; COM 1122, Computer Science Overview 2; MTH 1124, Calculus 2; MTH 1137, Discrete Mathematics 1; and one arts and sciences core course.
	Quarter 3	COM 1114, C Lab; COM 1201, Algorithms and Data Structures 2; ENG 1111, Freshman English 2; MTH 1125, Calculus 3; and one general elective.
	Quarter 4	COM 1130, Computer Organization and Design; one general elective; one science elective; and one arts and sciences core course.
	Quarter 5	COM 1102, Functional Programming and Applications; COM 1350, Automata and Formal Languages; MTH 1240, Chaos and Fractals; and one science elective.
	Quarter 6	COM 1390, Algorithms; one general elective; one science elective; and one arts and sciences core course.
	Quarter 7	COM 1358, Analysis of Programming Languages; ENG ____, middler year writing requirement; and two arts and sciences core courses.
Five-Year Bachelor of Arts Curriculum (with computer science courses beginning in the first year)	Quarter 8	MTH 1301, Linear Algebra 1; SOC 1485, Computers and Society; one computer science elective; and one arts and sciences core course.
	Quarter 9	One computer science elective; one general elective; and two arts and sciences core courses.
	Quarter 10	One computer science elective; two general electives; and one arts and sciences core course.
	Quarter 11	COM 1621, Computer Science Seminar; one computer science elective; two general electives; and one arts and sciences core course.
	Quarter 1	ENG 1110, Freshman English 1; MTH 1123, Calculus 1; one science elective; and one arts and sciences core course.
	Quarter 2	MTH 1124, Calculus 2; one general elective; one science elective; and one arts and sciences core course.
	Quarter 3	ENG 1111, Freshman English 2; MTH 1125, Calculus 3; one general elective; and one science elective.
	Quarter 4	COM 1100, Fundamentals of Computer Science; COM 1121, Computer Science Overview 1; MTH 1137, Discrete Mathematics 1; and two arts and sciences core courses.
	Quarter 5	COM 1101, Algorithms and Data Structures 1; COM 1122, Computer Science Overview 2; MTH 1240, Chaos and Fractals; and two arts and sciences core courses.
	Quarter 6	COM 1201, Algorithms and Data Structures 2; COM 1130, Computer Organization and Design; one general elective; and one arts and sciences core course.
	Quarter 7	COM 1102, Functional Programming and Applications; COM 1114, C Lab; COM 1350, Automata and Formal Language; ENG ____, middler year writing requirement; and one arts and sciences core course.
Five-Year Bachelor of Arts Curriculum (with computer science courses beginning in the second year)	Quarter 8	COM 1390, Algorithms; MTH 1301, Linear Algebra; SOC 1485, Computers and Society; and one general elective.
	Quarter 9	COM 1358, Analysis of Programming Languages; one computer science elective; one general elective; and one arts and sciences core course.

Four-Year Bachelor of Arts Curriculum

Quarter 10	Two computer science electives; one general elective; and one arts and sciences core course.
Quarter 11	COM 1621, Computer Science Seminar; one computer science elective; two general electives; and one arts and sciences core course.
Quarter 1	COM 1100, Fundamentals of Computer Science; COM 1121, Computer Science Overview 1; ENG 1110, Freshman English 1; MTH 1123, Calculus 1; and one arts and sciences core course.
Quarter 2	COM 1101, Algorithms and Data Structure 1; COM 1122, Computer Science Overview 2; MTH 1124, Calculus 2; MTH 1137, Discrete Mathematics 1; and one arts and sciences core course.
Quarter 3	COM 1114, C Lab; COM 1201, Algorithms and Data Structure 2; ENG 1111, Freshman English 2; MTH 1125, Calculus 3; and one general elective.
Quarter 4	COM 1130, Computer Organization and Design; one science course; and two arts and sciences core courses.
Quarter 5	COM 1102, Functional Programming and Applications; COM 1350, Automata and Formal Languages; MTH 1240, Chaos and Fractals; and one science course.
Quarter 6	COM 1358, Analysis of Programming Languages; one general elective; and two arts and sciences core courses.
Quarter 7	COM 1390, Algorithms; MTH 1301, Linear Algebra; SOC 1485, Computers and Society; and one science course.
Quarter 8	ENG ____, middler year writing requirement; one computer science elective; one general elective; and one arts and sciences core course.
Quarter 9	One computer science elective; one general elective; and two arts and sciences core courses.
Quarter 10	One computer science elective; two general electives; and one arts and sciences core course.
Quarter 11	COM 1621, Computer Science Seminar; one computer science elective; two general electives; and one arts and sciences core course.

College of Criminal Justice

James Alan Fox, PhD, *Dean*

Robert D. Croatti, PhD, *Associate Dean for Academic Operations and Programs*

Lester W. McCullough, Jr., BA, *Assistant Dean for Academic Services*

Robert E. Fuller, MA, *Assistant Dean for Student Administrative Services*

Charlayne Wilson, MEd, *Academic Counselor*

Professors

Edith E. Flynn, PhD

George L. Kelling, PhD

John H. Laub, PhD

Nicole F. Rafter, PhD

Associate Professors

Frank A. Schubert, JD

Wallace W. Sherwood, LLM

Assistant Professors

Nanette Graham, PhD

Melanie Myers, PhD

Mary Ann Zager, PhD

Schulman Professor

Harvey Burstein, JD

The College of Criminal Justice was established in 1967 as one of the first professional schools of its kind. Since its founding, the college has become a leading force in education, research, and policy-making in both the public and private sectors of the criminal justice field.

The college has a unified undergraduate major, leading to a Bachelor of Science degree in criminal justice, which comprehensively covers the field of criminal justice across both the public and private domains. Building on a solid foundation of required courses focusing on law, criminology, administration of justice, and research tools, the curriculum allows students to tailor their elective coursework, in such areas as homicide, terrorism, victims, juvenile justice, security, courts, and corrections, to suit their own professional interests. In addition, students take a variety of courses in other parts of the University, in such topic areas as computer science, English, math, history, economics, political science, sociology, and psychology.

The combined five-year academic and cooperative education program allows students to concentrate in one of three areas: policing and security, legal studies, and criminology and corrections. Students may also elect not to specialize; but instead to span the broadest possible coverage of the field.

In the policing and security emphasis students learn firsthand the latest developments in policing in the United States, such as community policing, and gain an understanding of the field of security from a business rather than a law enforcement perspective.

The legal studies concentration teaches students how to analyze the mechanics of law and the legal process and to examine the historical and philosophical foundations of our legal system. Students who concentrate on legal studies are well-prepared for law school.

In the criminology and corrections concentration students investigate the causes of crime and assess various correctional responses to criminal offending. This program is viewed as a stepping stone to advanced graduate study and to employment in the corrections area.

Co-op provides opportunities in the full range of career settings, including parole or probation offices, law firms, police departments, private security agencies, public or private institutions, social and government agencies, prisons, and planning and evaluation units. These career-oriented experiences help students to better understand the theory and research presented in their classes.

The college maintains close ties to criminal justice agencies in the community, such as the Boston Police Department and the Office of the Attorney General, and hosts the Justice George Lewis Ruffin Society, an organization of minority criminal justice professionals dedicated to expanding minority involvement and leadership in the criminal justice system. In addition, the college cooperates with the mayor's office and a number of private corporations in helping to run various community-based anti-crime programs. The college faculty also has a strong voice and participates actively in research and policy-making at a national and international level. Besides a variety of major research projects, the college houses the *Journal of Quantitative Criminology*, a leading international journal of research in criminology and criminal justice.

Students are required to maintain the following overall quality-point averages to advance to the next class rank and to graduate.

Class Entrance Requirements

Sophomore	1.4
Middler	1.6
Junior	1.8
Senior	1.9
To graduate	2.0

Graduation Requirements

Degree candidates must complete all prescribed work, a total of 176 quarter hours of credit. Students are also urged to meet the requirements of the Department of Cooperative Education.

Transfer Credit

No student transferring from another college or university is eligible to receive a degree until at least one year of academic work immediately preceding graduation has been completed at Northeastern.

Bachelor of Science Curriculum

Quarter 1	CJ 1101, Administration of Criminal Justice; HST 1101, Western Civilization to 1648; POL 1110, Introduction to Politics; and PSY 1111, Foundations of Psychology 1.
Quarter 2	CJ 1112, Critical Issues in Criminal Justice; COM 1105, Computer Science and Its Applications; ENG 1110, Freshman English 1; and HST 1102, Western Civilization Since 1648.
Quarter 3	CJ 1151, Introduction to Law and Legal Process 1; ENG 1111, Freshman English 2; PSY 1112, Foundation of Psychology 2; and SOC 1100, Introduction to Sociology.
Quarter 4	CJ 1201, Criminology; CJ 1251, Introduction to Criminal Law; POL 1111, Introduction to American Government; and one math/science requirement.
Quarter 5	CJ 1252, Criminal Due Process; POL 1318, State and Local Government; one math/science requirement; and one non-criminal justice elective.
Quarter 6	CJ 1453, Criminal Justice Research Methods; ECN 1115, Principles of Macroeconomics; ENG 1350, Intermediate Writing; and one criminal justice elective.
Quarter 7	CJ 1454, Criminal Justice Statistics; ECN 1116, Principles of Microeconomics; one criminal justice elective; and one non-criminal justice elective.
Quarters 8–11	28 quarter hours of criminal justice electives and 36 quarter hours of non-criminal justice electives.

College of Engineering

Paul H. King, PhD, *Dean*

Yaman Yener, PhD, *Associate Dean and Director, Graduate School of Engineering*

Richard J. Scranton, SM, *Associate Dean for Undergraduate Programs*

C. W. P. Finn, PhD, *Director of the School of Engineering Technology*

Cynthia Snow, MA, *Assistant Dean for Administration*

David C. Blackman, MS, *Assistant Dean and Director of Minority Affairs*

Paula G. Leventman, PhD, *Assistant Dean and Director of Women in Engineering*

Candace A. Martel, MEd, *Director of Engineering Student Services*

The College of Engineering prepares students to contribute to the accumulation and application of technical knowledge. The college aims to help students master the fundamental mathematical and scientific principles underlying a particular branch of engineering; develop and demonstrate competence in analysis and design appropriate to an engineering specialization; reason clearly and communicate effectively; and recognize the need to continue professional development.

Through laboratory exercises, senior design projects, professional association activities, and cooperative work assignments, students put theory into practice and clarify their professional goals.

The college offers a Bachelor of Science degree with specializations in chemical, civil, electrical and computer, industrial, and mechanical engineering. Although most students choose to complete the Bachelor of Science degree program in five years including seven quarters of cooperative education experience, four-year options without co-op work or with four quarters of work are also available. Students indicate their preference for the four-year option in the winter quarter of the freshman year.

The college also offers a general engineering program leading to a Bachelor of Science degree without specialization; this option is appropriate for students who want a strong technical base for advanced study in such fields as law, medicine, or business. A program of study for this option is arranged on an individual basis with a faculty adviser. A set of courses related to biomedical engineering is also available.

The college encourages students to study the social sciences and humanities, for they provide an awareness of the social, economic, political, aesthetic, and philosophical influences that shape the world in which graduates will practice their professions.

In addition to a full array of University services, special advising and other support services (including tutoring) are provided. Students may qualify to participate in honors sections of many courses. Active student chapters of many national professional engineering organizations and honor societies are supported by the college as an enriching addition to academic studies and co-op experience.

All Bachelor of Science degree programs with specification in an engineering discipline are accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (EAC/ABET). Part-time evening programs are also accredited.

Bachelor of Science/ Master of Science Joint Degree Program

The departments of electrical and computer engineering, industrial engineering and information systems, and mechanical engineering offer programs leading to both the bachelor's and master's degrees in five years. Degree candidates must maintain a 3.2 cumulative quality-point average, carry extra courses, and forego one cooperative work quarter in the senior year to complete the course requirements.

Class Entrance Requirements

Academic standards are published in the *College of Engineering Student Guide*, available at 220 Snell Engineering Center.

Graduation Requirements

The college reserves the right to amend programs, courses, and degree requirements to fulfill its educational responsibility to respond to relevant changes in the field.

Students must complete all of the requirements in the degree program in which they are candidates. Degree requirements are based upon the year of graduation, determined by the date of entry or re-entry into the College of Engineering. Degree requirements and the year of graduation for a degree candidate who fails to make normal academic progress for more than two quarters will be subject to review and possible change.

Students transferring from another college or university must complete at least 48 quarter hours at Northeastern University immediately preceding graduation to be eligible to receive the Bachelor of Science degree.

Bachelor of Science Curriculum for First Three Quarters

Students in full-time engineering degree programs take the following courses in the first three quarters.

Quarter 1	ENG 1110, Freshman English 1; GE 1101, Engineering Problem Solving and Computation; MTH 1123, Calculus 1; PHY 1221, Physics 1; and PHY 1521, Physics Lab 1.
Quarter 2	CHM 1131, General Chemistry 1; ENG 1111, Freshman English 2; GE 1102, Engineering Problem Solving with Application Software; MTH 1124, Calculus 2; and PHY 1222, Physics 2.
Quarter 3	CHM 1132, General Chemistry 2; GE 1103, Engineering Design and Graphics; MTH 1125, Calculus 3; PHY 1223, Physics 3; and PHY 1523, Physics Lab 2.

Biomedical Engineering

Samuel Fine, SM, MD, *Professor and Director*

Biomedical engineers work on both theoretical and practical problems of biological and medical significance. They may study the mechanism of action of natural and synthetic macromolecules, analyze the properties of blood, or investigate the structure and function of human organ systems.

A program incorporating engineering and the biological sciences can provide a sound foundation for a doctorate in medicine or dentistry, for a career in research, public health, biomedical engineering, or biotechnology, or for work as an engineer in a hospital or government agency.

The health-care, pharmaceutical, and biotechnology industries, in particular, seek individuals with a strong background in engineering supplemented by biological science education. Other career opportunities may include public health, the psychological sciences, and the marine sciences.

The biomedical engineering option has no fixed curriculum. Students work with an adviser to choose courses in the biological sciences that complement the standard engineering curriculum.

Chemical Engineering

Ralph A. Buonopane, PhD, *Associate Professor and Chair*

Professors

John A. Williams, PhD
Donald L. Wise, PhD,
Cabot Corporation
Professor of
Chemical Engineering

Associate Professors

Bernard M. Goodwin, ScD
Richard R. Stewart, PhD
Ronald J. Willey, PhD

Assistant Professor

Gilda A. Barabino, PhD
DiPietro Professor of
Chemical Engineering

The goal of the chemical engineering program is to offer students a broad education that stresses the fundamentals of science, technology, and engineering and incorporates state-of-the-art computer-aided design and management of production processes. An undergraduate degree in chemical engineering provides a solid background for graduate study or practice in the many diverse areas of chemical engineering found in industry.

Chemical engineers are creative problem-solvers whose work touches all our lives. They are involved in creating new products such as wonder drugs, materials that improve life on earth, and systems that make space exploration a reality.

Petrochemicals, biomedicines, pharmaceuticals, agricultural chemicals, plastics, fibers, and synthetic fuels are among the materials of the modern world that are the results of chemical engineering. Chemical engineers work on ways to reduce acid rain and smog, to recycle and reduce wastes, to develop new sources of environmentally clean energy, and to use existing resources safely and efficiently. Chemical engineers not only develop new products, but also seek ways to reduce costs, increase production, and improve the quality of existing products.

Cooperative education and career opportunities for chemical engineering students are found in companies working with all of these technologies that touch our lives. As students gain more knowledge through co-op and academic work, cooperative education assignments increase in responsibility and challenge towards fully professional levels.

Bachelor of Science Curriculum

Quarters 1-3	See above. (In Quarter 3 replace PHY 1523 with CHM 1138, General Chemistry Lab.)
Quarter 4	CHE 1201, Chemical Engineering Calculations 1; CHE 1205, Computation Lab; CHM 1271, Organic Chemistry 1; MTH 1223, Calculus 4; and one social science/humanities elective.
Quarter 5	CHE 1202, Chemical Engineering Calculations 2; CHM 1272, Organic Chemistry 2 with Lab; MTH 1225, Differential Equations (Engineering) 1; and one social science/humanities elective.

Quarter 6	CHE 1211, Chemical Engineering Thermodynamics 1; CHM 1381, Physical Chemistry 1; CHM 1394, Experimental Physical Chemistry 1; MTH 1230, Linear Algebra; and one social science/humanities elective.
Quarter 7	CHE 1310, Chemical Engineering Thermodynamics 2; CHE 1321, Momentum Transport; CHM 1382, Physical Chemistry 2; CHM 1395, Experimental Physical Chemistry 2; and ENG 1125, Technical Writing 1.
Quarter 8	CHE 1415, Experimental Methods 1; CHE 1421, Chemical Engineering Kinetics; CHE 1431, Heat Transport; and ECN 1115, Principles of Macroeconomics.
Quarter 9	CHE 1416, Experimental Methods 2; CHE 1441, Separation Processes; CHE 1450, Chemical Engineering Economics; and one social science/humanities elective.
Quarter 10	CHE 1501, Process Design 1; CHE 1512, Chemical Process Control; one chemical engineering elective; and one engineering elective.
Quarter 11 (Spring only)	CHE 1502, Process Design 2; two chemical engineering electives; and one advanced chemistry elective.

Civil Engineering

Mishac K. Yegian, PhD, *Professor and Chair*

Professors

Frederic C. Blanc, PhD
John J. Cochrane, PhD
Constantine J. Gregory, PhD
Paul H. King, PhD
Kenneth M. Leet, ScD

Associate Professors

Dionisio Bernal, PhD
Peter G. Furth, PhD
John G. Schoon, PhD
Richard J. Scranton, SM
Ali Touran, PhD
Irvine W. Wei, PhD

Assistant Professors

Mark D. Evans, PhD
Neven Krstulovic, PhD
Ajiboye F. Oluokun, PhD
Thomas C. Sheahan, ScD
Sara Wadia-Fascetti, PhD

Adjunct Professor

Sidney J. Wartel, JD

Civil engineers judiciously apply their knowledge of mathematics and physical sciences to improve and protect the environment and to provide facilities and structures for community living, industry, and transportation. Civil engineering encompasses several disciplines, including structural engineering, environmental engineering, transportation planning and engineering, and geotechnical engineering. Civil engineers supervise the construction of bridges, tunnels, buildings, dams, and aqueducts. Civil engineers plan, design, construct, and manage highways, railroads, canals, and airports; regulate rivers and control floods; design and build systems for water distribution, wastewater treatment, refuse disposal, and environmental remediation.

The civil engineering program offers a fundamental and rigorous yet flexible engineering education—an education that will weather inevitable changes within the field. The curriculum is intended to provide students with a solid background for careers in planning, design, construction, and engineering management. Students acquire a common base of knowledge in the engineering sciences, including structural mechanics, fluid mechanics, and environmental science. In more advanced courses, students learn to analyze and design structural systems (such as building frames and bridges), water and wastewater treatment systems, highways and mass transit systems, hydraulic systems, earth dams, and building foundations. Students use some of their electives to concentrate in one of four areas: structural, environmental, geotechnical, or transportation engineering.

Students also study the background within which they will practice engineering through a variety of courses in the social sciences and humanities, as well as specific courses dealing with law, professional ethics, and engineering management.

The co-op program parallels the academic program in level of responsibility and sophistication. A beginning job might involve layout at a construction site or laboratory testing; in senior level co-op assignments, students are often working alongside engineers on design teams.

Bachelor of Science Curriculum

Quarters 1–3	See page 95.
Quarter 4	CIV 1210, Structural Mechanics 1; CIV 1510, Materials; CIV 1511, Materials Lab; MTH 1223, Calculus 4; and one social science/humanities elective.
Quarter 5	CIV 1211, Structural Mechanics 2; CIV 1620, Engineering Measurements; CIV 1621, Engineering Measurements Lab; ECN 1116, Principles of Microeconomics; and MTH 1225, Differential Equations (Engineering) 1.
Quarter 6	CIV 1220, Structural Analysis 1; CIV 1226, Structural Analysis and Design Lab; CIV 1310, Fluid Mechanics; MTH 1230, Linear Algebra; and one social science/humanities elective.

Quarter 7	CIV 1240, Concrete Design I; CIV 1340, Environmental Engineering I; CIV 1410, Soil Mechanics; CIV 1411, Soil Mechanics Lab; and ENG 1125, Technical Writing I.
Quarter 8	CIV 1250, Steel Design I; ME 1320, Dynamics for Civil Engineers; and two technical electives.
Quarter 9	CIV 1665, Professional Issues for Civil Engineers; IIS 1366, Engineering Economy; CIV 1640, Applied Probability Theory for Civil Engineers; and two technical electives.
Quarter 10	Two technical electives; one social science/humanities elective; and one general elective.
Quarter 11	One capstone elective; two technical electives; and one social science/humanities elective.

Electrical and Computer Engineering

John G. Proakis, PhD, *William Lincoln Smith Professor and Chair*

Professors

Chung Chan, PhD
 Anthony J. Devaney, PhD
 James M. Feldman, PhD
 Samuel Fine, SM, MD
 Arvin Gabel, ScD
 Sarma S. Mulukutla, PhD
 Sheila Prasad-Hinchey, PhD
 Sheldon S. Sandler, PhD
 Martin E. Schetzen, ScD
 Philip E. Serafin, ScD
 Michael B. Silevitch, PhD
 Carmine Vittoria, PhD

Associate Professors

Soeren Buus, PhD
 Vinay Ingle, PhD
 Clas A. Jacobson, PhD
 Wayne G. Kellner, ScD
 Hanoch Lev-Ari, PhD
 Elias S. Manolakos, PhD
 Robert N. Martin, MS
 Nicol E. McGruer, PhD
 Stephen W. McKnight, PhD
 Lazaros Merakos, PhD
 Ramachandran Raghavan, PhD
 Carey M. Rappaport, ScD
 Bahram Shafai, ScD
 Ioannis Stavrakakis, PhD
 Gilead Tadmor, PhD
 Man-Kuan Vai, PhD
 Paul M. Zavracky, PhD

Assistant Professors

David Brady, PhD
 Dana Brooks, PhD
 Jill D. Crisman, PhD
 Edward W. Czeck, PhD
 Lisa Dron, PhD
 Jeffrey A. Hopwood, PhD
 David R. Kaeli, PhD
 Anthony B. Maddox, PhD
 David J. McLaughlin, PhD
 Eric Miller, PhD
 Sampath Rangarajan, PhD
 Masoud Salehi, PhD
 Aleksandar M. Stankovic, PhD

Lecturers

Jack I. Hanania, PhD
 Jacob Shekel, DSc

In electrical and computer engineering, students gain the knowledge and skills to address such problems as transferring and managing information, improving industrial productivity, conserving energy, and finding alternative energy sources. Electrical engineers have had a primary role in the development of the computer, integrated circuits, the pacemaker, satellite communication, space navigation, microprocessors, television, and the means of providing energy.

Some electrical engineers work in traditional areas of system design and development; others apply their skills in areas as diverse as ocean exploration, meteorology, transportation, experimental psychology, electronic music, health care systems, bioelectronics, and the development of educational devices for individuals with special needs.

The curriculum incorporates both information sciences, which focus on systems whose function is computation, communication, or control, and energy resources, which focus on the sources, generation, and distribution of large quantities of electrical energy.

The academic program is supported by extensive laboratory facilities for study and experimentation in computing, circuit analysis, electronics, digital systems, microwaves, control systems, semiconductor processing, VLSI design, digital signal processing, and power and energy conversion.

In addition to electrical engineering, the department offers options in computer engineering and power systems engineering. All options are based on a common core program, with a special concentration during the last two years of study. The computer engineering option allows specialization in designing and integrating digital computers within larger systems for communications, resource management, and automatic control. The power systems engineering option is conducted in cooperation with electric power companies in New England and other eastern states and allows students to specialize in energy resources.

In the cooperative work phase of the program, co-op jobs generally increase in the level of responsibility as students gain theoretical and technical knowledge through their academic work. A sophomore might begin cooperative work experience as an engineering assistant and progress by the senior year to a position with responsibilities similar to entry-level engineers.

**Option in
Computer Engineering**

For those who wish to specialize in designing and integrating digital computers within larger systems for communications, resource management, and automatic control, this option offers a basic but comprehensive knowledge of the principles underlying the organization, design, and applications of digital processing systems. Both hardware and software design are covered.

**Option in
Power Systems
Engineering**

This option is designed for students who wish to specialize in energy resources. The program is conducted in cooperation with electric power companies in New England and several eastern states.

**Bachelor of Science in
Electrical Engineering
Curriculum**

Quarters 1–3	See page 95.
Quarter 4	ECE 1215, Circuits and Systems 1 and ECE 1221, Measurements Lab; MTH 1225, Differential Equations (Engineering); PHY 1224, Physics 4; and one social science/humanities elective.
Quarter 5	ECE 1216, Circuits and Systems 2 and ECE 1222, Circuits Lab 1; ME 1321, Mechanics for Electrical Engineers; MTH 1223, Calculus 4; and one social science/humanities elective.
Quarter 6	ECE 1217, Circuits and Systems 3 and ECE 1223, Circuits Lab 2; ECE 1346, Electronics 1; ECE 1381, Computer Engineering 1; and ME 1340, Thermodynamics <i>or</i> ME 1386, Materials Science.
Quarter 7	ECE 1332, Linear Systems 1; ECE 1347, Electronics 2 and ECE 1224, Electronics Lab 1; ECE 1382, Computer Engineering 2 and ECE 1229, Digital Systems Lab; and ENG 1125, Technical Writing.
Quarter 8	ECE 1333, Linear Systems 2 and ECE 1226, Discrete Systems Lab; ECE 1349, Electronic Design 1 and ECE 1225, Electronics Lab 2; ECE 1363, Electromagnetic Field Theory 1; and ECE 1383, Computer Engineering 3.
Quarter 9	ECE 1364, Electromagnetic Field Theory 2 and ECE 1227, Electromagnetic Fields Lab 1; MTH 1384, Probability for Engineering; one social science/humanities elective; and one technical elective.
Quarter 10	ECE 1365, Electromagnetic Fields and Energy Conversion and ECE 1228, Electromagnetic Fields Lab 2; ECE 1454, Communication Systems; one social science/humanities elective; and one technical elective.
Quarter 11	ECE 1408, Physical Electronics <i>or</i> ECE 1420, Control Systems and ECE 1235, Control Systems Lab <i>or</i> ECE 1465, Wave Transmission and Reception; one social science/humanities elective; and two technical electives.

**Bachelor of Science in
Electrical Engineering
Computer Engineering
Option Curriculum**

Quarter 1–3	See page 95.
Quarter 4	ECE 1215, Circuits and Systems 1 and ECE 1221, Measurements Lab; MTH 1225, Differential Equations (Engineering); PHY 1224, Physics 4; and one social science/humanities elective.
Quarter 5	ECE 1216, Circuits and Systems 2 and ECE 1222, Circuits Lab 1; ME 1321, Mechanics for Electrical Engineers; MTH 1223, Calculus 4; and one social science/humanities elective.
Quarter 6	ECE 1217, Circuits and Systems 3 and ECE 1223, Circuits Lab 2; ECE 1346, Electronics 1; ECE 1381, Computer Engineering 1; and ME 1340, Thermodynamics <i>or</i> ME 1386, Materials Science.
Quarter 7	ECE 1332, Linear Systems 1; ECE 1347, Electronics 2 and ECE 1224, Electronics Lab 1; ECE 1382, Computer Engineering 2 and ECE 1229, Digital Systems Lab; and ENG 1125, Technical Writing.
Quarter 8	ECE 1333, Linear Systems 2 and ECE 1226, Discrete Systems Lab; ECE 1349, Electronic Design 1 and ECE 1225, Electronics Lab 2; ECE 1363, Electromagnetic Field Theory 1; and ECE 1383, Computer Engineering 3.
Quarter 9	ECE 1364, Electromagnetic Field Theory 2 and ECE 1227, Electromagnetic Fields Lab 1; ECE 1384, Computer Engineering 4; MTH 1384, Probability for Engineering; and one social science/humanities elective.
Quarter 10	ECE 1351, Topics in IC Design and ECE 1230, VLSI Systems Design Lab; ECE 1365, Electromagnetic Fields and Energy Conversion and ECE 1228, Electromagnetic Fields Lab 2; ECE 1454, Communication Systems; and one social science/humanities elective.
Quarter 11	One social science/humanities elective and three technical electives.

**Bachelor of Science in
Electrical Engineering
Power Systems Option
Curriculum**

Quarters 1–3	See page 95.
Quarter 4	ECE 1215, Circuits and Systems 1 and ECE 1221, Measurements Lab; MTH 1225, Differential Equations (Engineering); PHY 1224, Physics 4; and one social science/humanities elective.
Quarter 5	ECE 1216, Circuits and Systems 2 and ECE 1222, Circuits Lab 1; ME 1321, Mechanics for Electrical Engineers; MTH 1223, Calculus 4; and one social science/humanities elective.
Quarter 6	ECE 1217, Circuits and Systems 3 and ECE 1223, Circuits Lab 2; ECE 1346, Electronics 1; ECE 1381, Computer Engineering 1; and ME 1340, Thermodynamics 1.
Quarter 7	ECE 1332, Linear Systems 1; ECE 1347, Electronics 2 and ECE 1224, Electronics Lab 1; ECE 1382, Computer Engineering 2 and ECE 1229, Digital Systems Lab; and ENG 1125, Technical Writing.
Quarter 8	ECE 1333, Linear Systems 2 and ECE 1226, Discrete Systems Lab; ECE 1349, Electronic Design 1 and ECE 1225, Electronics Lab 2; ECE 1363, Electromagnetic Field Theory 1; and one social science/humanities elective.
Quarter 9 (Spring only)	ECE 1364, Electromagnetic Field Theory 2 and ECE 1227, Electromagnetic Fields Lab 1; ECE 1471, Electrical Power Systems 1; MTH 1384, Probability for Engineering; and one social science/humanities elective.
Quarter 10 (Winter only)	ECE 1365, Electromagnetic Fields and Energy Conversion and ECE 1228, Electromagnetic Fields Lab 2; ECE 1472, Electrical Power Systems 2 and ECE 1231, Electrical Power Lab 1; one social science/humanities elective; and one technical elective.
Quarter 11 (Spring only)	ECE 1371, Electrical Machines 1 and ECE 1232, Electrical Power Lab 2; ECE 1379, Transients in Electrical Power Systems; ECE 1474, Power Electronics; and one technical elective.

General Engineering
Advisory Committee

 Richard R. Stewart, PhD, *Chemical Engineering, Chair*

 Peter Furth, PhD, *Civil Engineering*

 Arvin Grabel, ScD, *Electrical Engineering*

 Ronald F. Perry, PhD, *Industrial Engineering*

 Mohamad Metghalchi, ScD, *Mechanical Engineering*

The goal of the general engineering program is to provide students with flexible, interdisciplinary opportunities to study basic engineering concepts plus courses in areas related to their interests, such as business or science.

This program is designed for students interested in engineering-related professions rather than a specific engineering discipline. It is highly elective and enables students to tailor their studies to meet their particular objectives. A general engineering background offers the foundation for advanced study in such areas as medicine, law, or business, particularly for those interested in the more technical aspects or applications of those professions. Students who complete an adviser-approved program receive an unspecified Bachelor of Science degree from the College of Engineering.

**Bachelor of Science
Curriculum**

Quarters 1–3	See page 95. (Replace CHM 1131 and CHM 1132 with social science/humanities electives.)
Quarter 4	MTH 1223, Calculus 4; one basic science elective; one engineering science elective; and one social science/humanities elective.
Quarter 5	MTH 1225, Differential Equations (Engineering) 1; one engineering science elective; one coordinated study elective; and one social science/humanities elective.
Quarter 6	ENG 1340, Writing Workshop 1; one engineering science elective; two coordinated study electives; and one social science/humanities elective.
Quarter 7	Two engineering science electives; one coordinated study elective; and one social science/humanities elective.
Quarter 8	Two engineering science electives and two coordinated study electives.
Quarter 9	Two engineering science electives and two coordinated study electives.
Quarter 10	Two engineering science electives and two coordinated study electives.
Quarter 11	One engineering science elective and three coordinated study electives.

Industrial Engineering and Information Systems

Thomas P. Cullinane, PhD, *Professor and Acting Chair*

Professors

Stuart J. Deutsch, PhD
Ronald R. Mourant, PhD

Associate Professors

Nasser Fard, PhD
Surendra M. Gupta, PhD
Thomas E. Hulbert, MS
Mieczyslaw M. Kokar, PhD
Emanuel S. Melachrinoudis, PhD
Ronald F. Perry, PhD
Gerard Volland, PhD,
*George A. Snell Professor of
Engineering*
Ching-Cheng Wang, PhD

Assistant Professors

M. Louis Brennan, PhD
Mary E. Helander, PhD
Sagar V. Kamarthi, PhD
Anthony B. Maddox, PhD

Industrial engineering involves the design and analysis of systems that include people, equipment, and materials and their interactions and performance in the workplace. The industrial engineer collects this information and evaluates alternatives to make decisions that best advance the goals of the enterprise.

The program in industrial engineering and information systems offers students a base of traditional engineering courses such as production systems, work design, probability, statistics, and engineering economy, while emphasizing such contemporary areas as simulation, material handling, computer software, quality control, and operations research.

To gain the skills they need to make informed managerial and professional decisions, students take courses in management, economics, and technical subjects, as well as in the humanities and social sciences.

Industrial engineers work in manufacturing firms, hospitals, banks, public utilities, government agencies, insurance companies, and construction firms. Among the projects they undertake are design and implementation of a computer-integrated manufacturing system, design of a robotics system in a manufacturing environment, long-range corporate planning, development and implementation of a quality-control system, design of workstations to enhance worker safety and productivity, and development of computer systems for information control.

Co-op jobs generally increase in level of responsibility as students gain theoretical and technical knowledge through their academic work. A sophomore might begin as a computer analyst evaluating the performance of a manufacturing system and progress to designing manufacturing engineering workstations by the senior year.

Bachelor of Science Curriculum

Quarters 1–3	See page 95.
Quarter 4	ECN 1115, Principles of Macroeconomics; IIS 1200, Work Design; MTH 1223, Calculus 4; and one behavioral science, social science, or humanities elective.
Quarter 5	ECN 1116, Principles of Microeconomics; IIS 1330, Computation and Programming 1; ME 1201, Statics; and MTH 1225, Differential Equations (Engineering) 1.
Quarter 6	ECE 1171, Electrical Engineering 1; IIS 1300, Probabilistic Analysis for Engineers; and MTH 1230, Linear Algebra; and one engineering science elective.
Quarter 7	IIS 1360, Engineering Economy; one technical elective; one behavioral science, social science, or humanities elective; and one open elective.
Quarter 8	IIS 1310, Statistics; IIS 1340, Operations Research 1; IIS 1475, Human-Machine Systems; and HRM 1432, Organizational Behavior.
Quarter 9	IIS 1341, Operations Research 2; IIS 1350, Digital Simulation Techniques; ENG 1125, Technical Writing; one engineering science elective; and one behavioral science, social science, or humanities elective.
Quarter 10	IIS 1405, Production and Inventory Control; IIS 1436, Quality Assurance; and two technical electives.
Quarter 11	IIS 1401, Design Project; two IIS technical electives; and one behavioral science, social science, or humanities elective.

Mechanical Engineering

John W. Cipolla, Jr., PhD, *Professor and Chair*

Professors

George G. Adams, PhD
Alexander M. Gorlov, PhD
Richard J. Murphy, PhD
Hamid Nayeib-Hashemi, PhD
John N. Rossettos, PhD
Mohammad E. Taslim, PhD
Yaman Yener, PhD
Ibrahim Zeid, PhD

Associate Professors

Charles W. P. Finn, PhD
Olusegun J. Ilegbusi, PhD
Gregory J. Kowalski, PhD
Yianuis A. Levendis, PhD
Achille Messac, PhD
Mohaniad Metghalchi, ScD
Uichiro Narusawa, PhD

Professors Emeriti

Charles A. Berg, ScD
Ralph S. Blanchard, MS
Arthur R. Foster, MEng
Bertram S. Long, MEng
Wesville B. Nowak, PhD
Alvin J. Yorra, MS
John Zotos, MEng

Assistant Professors

Andrew V. Tangborn, PhD
Charles S. White, PhD
Mary Grace Williams, PhD
Bruce H. Wilson, PhD

Senior Research Engineer

Joseph T. Blucher, PhD

Mechanical engineering involves the design, development and manufacture of machinery and devices to transmit power or to convert energy from thermal to mechanical form in order to power the modern world and its machines. Its current practice has been heavily influenced by recent advances in computer hardware and software.

Mechanical engineers use computers to formulate preliminary and final designs of systems or devices, to perform calculations that predict the behavior of the design, and to collect and analyze performance data from system testing or operation.

Traditionally, mechanical engineers have designed and tested such devices as heating and air-conditioning systems, machine tools, internal combustion engines, and steam power plants. Today they also play primary roles in the development of new technologies in a variety of fields—energy conversion, solar energy utilization, environmental control, prosthetics, transportation, manufacturing, and new materials development.

The curriculum in mechanical engineering focuses on three areas: applied mechanics, thermofluids engineering, and materials science. Applied mechanics is the study of the motion and deformation of the structural elements acted on by forces in devices that range from rotating industrial dynamos to dentists' drills. Thermofluids engineering deals with the motion of fluids and the transfer of energy, as in the cooling of electronic components or the design of gas turbine engines. Materials science is concerned with the relationship between the structure and properties of materials and with the control of structure, through processing, to achieve the desired properties. Practical applications are in the development of composite materials and in metallurgical process industries.

Courses in each area form the foundation for advanced analytical and creative design courses that culminate in a two-quarter senior design project. Faculty encourage students throughout the curriculum to use computer-aided design tools and high-performance computer workstations.

Cooperative education assignments increase in responsibility and technical challenge as students progress through the program. Initial positions may involve computer intensive CAD/CAM assignments or programming tasks, while more advanced jobs will place students in charge of quality control systems and performance testing of equipment.

Bachelor of Science Curriculum

Quarters 1–3	See page 95.
Quarter 4	ECN 1115, Principles of Macroeconomics or ECN 1116, Principles of Microeconomics; ME 1201, Statics; ME 1360, Thermodynamics 1; and MTH 1223, Calculus 4.
Quarter 5	ME 1392, Measurement and Analysis; ME 1202, Dynamics 1; ME 1361, Thermodynamics 2; and MTH 1225, Differential Equations (Engineering) 1.
Quarter 6	ENG 1340, Writing Workshop; ME 1203, Strength of Materials 1; ME 1315, Dynamics 2; ME 1375, Fluid Mechanics 1; and MTH 1226, Differential Equations (Engineering) 2.
Quarter 7	ME 1314, Strength of Materials 2; ME 1365, Heat Transfer; MTH 1230, Linear Algebra; and ME 1380, Materials Science.
Quarter 8	ME 1335, Mechanical Design; ME 1362, Thermodynamics 3; ME 1480, Mechanical Behavior of Materials; or ECE 1171, Electrical Engineering; and one social science/humanities elective.
Quarter 9	ME 1337, Thermal Design; ME 1415, Mechanical Vibrations; ME 1483, Materials Processing or ECE 1171, Electrical Engineering; and one social science/humanities elective.

Quarter 10	ME 1336, Design Project 1; two technical electives*; and one social science/humanities elective.
Quarter 11	ME 1338, Design Project 2; two technical electives*; and one social science/humanities elective.

*An approved physics/science elective must be taken in either quarter 10 or quarter 11.

Part-Time Evening Engineering

The Part-Time Engineering Program is designed to meet the needs of individuals who must combine full-time work responsibilities with part-time evening study. This six-year, part-time evening curriculum leads to a degree of Bachelor of Science in civil, electrical, or mechanical engineering. Admissions and course requirements are identical to the full-time, five-year cooperative degree programs. For an application and more information contact 220 Snell, 373-2185. The program coordinator is Caryn Vigoda, MEd.

Part-Time Evening Curriculum for Bachelor of Science

All programs follow the same curriculum for years one and two.

First Year	Fall Quarter	GE 1101, Problem Solving and Computation and MTH 1123, Calculus 1.
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	Winter Quarter	CHM 1131, Chemistry 1; GE 1102, Problem Solving with Application Software; and MTH 1124, Calculus 2.
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	Spring Quarter	CHM 1132, Chemistry 2 and MTH 1125, Calculus 3.
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Second Year	Fall Quarter	MTH 1223, Calculus 4; PHY 1221, Physics 1; and PHY 1521, Physics 1 Lab.
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	Winter Quarter	MTH 1225, Differential Equations (Engineering) 1; and PHY 1222, Physics 2.
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	Spring Quarter	GE 1103, Engineering Graphics and Design; PHY 1223, Physics 3; and PHY 1523, Physics 3 Lab.
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Part-Time Evening Curriculum for Bachelor of Science in Civil Engineering

Third Year	Fall Quarter	CIV 1210, Structural Mechanics 1; and CIV 1620, Engineering Measurements <i>or</i> CIV 1340, Environmental Engineering 1.
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	Winter Quarter	CIV 1211, Structural Mechanics 2; MTH 1230, Linear Algebra <i>or</i> CIV 1640, Applied Probability Theory for Civil Engineers.
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	Spring Quarter	CIV 1310, Fluid Mechanics; CIV 1410, Soil Mechanics and CIV 1411, Soil Mechanics Lab <i>or</i> CIV 1510, Materials and CIV 1511, Materials Lab.
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Fourth Year	Fall Quarter	CIV 1220, Structural Analysis 1 and CIV 1226, Structural Analysis Lab; and CIV 1340, Environmental Engineering 1 <i>or</i> CIV 1620, Engineering Measurements.
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	Winter Quarter	CIV 1240, Design of Reinforced Concrete Structures 1; MTH 1230, Linear Algebra <i>or</i> CIV 1640, Applied Probability Theory for Civil Engineers.
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	Spring Quarter	CIV 1250, Steel Design 1; CIV 1510, Materials and CIV 1511, Materials Lab <i>or</i> CIV 1410, Soil Mechanics and CIV 1411, Soil Mechanics Lab.
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Environmental Concentration

Fifth and Sixth Years		CIV 1245, Advanced Structure Design; CIV 1320, Hydraulic Engineering; CIV 1341, Environmental Engineering 2; CIV 1350, Environmental/Hydraulic Lab; CIV 1395, Environmental Design Project; CIV 1420, Foundation Engineering; CIV 3636, Transportation Engineering; CIV 3642, Transportation Planning; IIS 1366, Engineering Economy; ME 1320, Dynamics; ME 1340, Thermodynamics; and a general elective.
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Structural Concentration

Fifth and Sixth Years		CIV 1222, Structural Analysis 2; CIV 1245, Advanced Structure Design; CIV 1295, Structural Design Project; CIV 1320, Hydraulic Engineering; CIV 1341, Environmental Engineering 2; CIV 1420, Foundation Engineering; CIV 3636, Transportation Engineering; CIV 3642, Transportation Planning; IIS 1366, Engineering Economy; ME 1320, Dynamics; ME 1340, Thermodynamics; and a general elective.
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**Part-Time Evening
Curriculum for Bachelor
of Science in Electrical
and Computer Engineering**

		Summer Quarters	During the summer quarters students are expected to take ENG 1110, Freshman English 1; ENG 1111, Freshman English 2; ECN 1116, Principles of Microeconomics; ENG 1125, Technical Writing; four adviser-approved social science/humanities electives; and CIV 1665, Professional Issues in Civil Engineering.
	Third Year	Fall Quarter	ECE 1215, Circuits and Systems 1; ECE 1221, Measurements Lab; and PHY 1224, Physics 4.
		Winter Quarter	ECE 1216, Circuits and Systems 2; ECE 1222, Circuits Lab 1; and ME 1321, Mechanics for Electrical Engineers.
		Spring Quarter	ECE 1217, Circuits and Systems 3; ECE 1223, Circuits Lab 2; and MTH 1384, Probability.
	Fourth Year	Fall Quarter	ECE 1332, Linear Systems 1 and ECE 1346, Electronics 1.
		Winter Quarter	ECE 1224, Electronics Lab 1; ECE 1226, Discrete Systems Lab 1; ECE 1333, Linear Systems 2; and ECE 1347, Electronics 2.
		Spring Quarter	ECE 1225, Electronics Lab 2; ECE 1349, Electronic Design 1; and ME 1340, Thermodynamics 1 or ME 1386, Materials Science.
	Fifth Year	Fall Quarter	ECE 1363, Electromagnetic Field Theory 1 and ECE 1381, Computer Engineering 1.
		Winter Quarter	ECE 1227, Electromagnetic Field Lab; ECE 1229, Digital Systems Lab; ECE 1364, Electromagnetic Field Theory 2; and ECE 1382, Computer Engineering 2.
		Spring Quarter	ECE 1228, Electromagnetic Field and Energy Conversion Lab 2; ECE 1365, Electromagnetic Fields and Energy Conversion; and ECE 1383, Computer Engineering 3.
	Sixth Year	Fall Quarter	Choose two technical electives from the following. ECE 1351, Special Topic IC Design and ECE 1230, VLSI System Design Lab; ECE 1408, Physical Electronics; ECE 1471, Electrical Power Systems 1; or ECE 1486, Numerical Methods and Computer Applications.
		Winter Quarter	Choose two technical electives from the following. ECE 1420, Control Systems and ECE 1235, Control Systems Lab; ECE 1384, Computer Engineering 4; ECE 1472, Electrical Power Systems 2 and ECE 1231, Electric Power Lab or MTH 1351, Function of a Computer Variable.
		Spring Quarter	ECE 1454, Communication Systems; ECE 1456, Digital Signal Processing and ECE 1234, Digital Signal Processing Lab or ECE 1465, Wave Transmission and Reception.
		Summer Quarters	During the summer quarters students are expected to take ENG 1110, Freshman English 1; ENG 1111, Freshman English 2; five adviser-approved social science/humanities electives; and ENG 1125, Technical Writing.

**Part-Time Evening
Curriculum for Bachelor
of Science in Mechanical
Engineering**

	Third Year	Fall Quarter	ME 1201, Statics and PHY 1224, Physics 4.
		Winter Quarter	ME 1392, Measurements and Analysis and MTH 1230, Linear Algebra.
		Spring Quarter	MTH 1226, Mathematical Analysis 2 and ME 1360, Thermodynamics 1.
	Fourth Year	Fall Quarter	ME 1203, Strength of Materials 1 and ME 1361, Thermodynamics 2.
		Winter Quarter	ME 1202, Dynamics 1 and ME 1375, Fluid Mechanics.
		Spring Quarter	ME 1314, Strength of Materials 2 and ME 1365, Heat Transfer.

Fifth Year	Fall Quarter	ME 1335, Mechanical Design and ME 1337, Thermal Design.
	Winter Quarter	ME 1336, Design Project 1 and ME 1380, Materials Science.
	Spring Quarter	ME 1338, Design Project 2 and ME 1480, Mechanical Behavior of Materials.
	Summer Quarter	An additional ME technical elective is required in the summer following the fifth year.
Sixth Year	Fall Quarter	ECE 1171, Electrical Engineering 1 and ME 1362, Thermodynamics 3.
	Winter Quarter	ENG 1340, Writing Workshop; ME 1315, Dynamics 2; and one technical elective.
	Spring Quarter	ME 1415, Mechanical Vibrations; and one technical elective.
	Summer Quarters	During the summer quarters students are expected to take ENG 1110, Freshman English 1; ENG 1111, Freshman English 2; ECN 1115, Principles of Macroeconomics or ECN 1116, Principles of Microeconomics; and four adviser-approved social science/humanities electives.

School of Engineering Technology

C. W. P. Finn, PhD, *Director*

Roy Dalsheim, BS, *Assistant Director*

Rasma Galins, *Assistant Director*

Professor

Samuel Fine, MD
*Electrical Engineering
Technology*

Associate Professors

David S. Goldman, MS, PE
Computer Technology
Eric W. Hansberry, MS
Design Graphics

George F. Kent, MS, MBA, PE
*Mechanical Engineering
Technology*
Nonna K. Lehmkuhl, MEd, MS
Computer Technology

Assistant Professors

John E. Hajjar, PhD
Computer Technology
Frederick J. Nohmer, EdD
*Electrical Engineering
Technology*

Lecturers

Masoud Olia, PhD
*Mechanical Engineering
Technology*
Ronald E. Scott, ScD, PE
*Electrical Engineering
Technology*
Jerome Tapper, BS, PE
*Electrical Engineering
Technology*

The programs in the School of Engineering Technology concentrate on the applications of technology and emphasize the rational processes involved in converting theories and ideas into practical techniques, procedures, and products. Fundamentals are related to current practice, providing a supportive "why" for the practical "how." The study of the humanities and social sciences helps students gain a balanced, well-rounded education.

Engineering technologists work with professional engineers, scientists, medical doctors, supervisors, and craftspersons to develop techniques for converting scientific knowledge and craftsmanship into products. The curriculum helps students understand the scientific principles that govern current technology; apply technology to problem solving; communicate effectively the important implications of technological advances; and acquire the motivation for continued development of technical skills.

The school offers five-year cooperative education programs in mechanical engineering technology, electrical engineering technology, and computer technology—all leading to the degree of Bachelor of Science in Engineering Technology. A firm choice of major may be delayed until the spring quarter of the freshman year.

For transfer students, the school offers a three-year Bachelor of Science degree program with a major in aerospace maintenance engineering technology.

The electrical and mechanical engineering technology baccalaureate day programs and the part-time baccalaureate programs in mechanical and electrical engineering technology are accredited by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology (TAC/ABET). The part-time program leading to an Associate of Science in engineering degree with majors in electrical and mechanical engineering technology are also accredited by TAC/ABET.

The part-time programs include courses and degree programs leading to the Associate in Engineering (AE), the Associate in Science (AS), and the Bachelor of Science in Engineering Technology (BSET). The AE degree may be earned in computer technology and in environmental, structural, survey and highway, electrical, and mechanical engineering technology. The AS degree may be earned in telecommunications.

Students may also earn the BSET in computer technology, mechanical, electrical, or manufacturing engineering technology. A degree in aerospace maintenance engineering technology is available for transfer students who have completed an airframe and power plant curriculum.

For more information on part-time programs, contact Northeastern University, School of Engineering Technology, 120 Snell Engineering Center, Boston, MA 02115; or call 617-373-2500 (voice), 617-373-8526 (TTY), or 617-373-2501 (FAX).

Part-Time Evening and Weekend Programs

Class Entrance Requirements

The minimum overall quality-point averages listed are required for students to advance to the next rank and to graduate.

Sophomore	1.4
Middler	1.6
Junior	1.8
Senior	2.0
To graduate	2.0

A cumulative quality-point average of 2.0 or better in major courses is required for graduation. Students are expected to carry the normal prescribed curriculum for the program. Details on criteria for academic probation and suspension are available at 120 Snell Engineering Center.

Graduation Requirement

Students transferring from another college or university are not eligible to receive the degree until they have completed at least one academic year at Northeastern immediately preceding their graduation.

For more information about programs and requirements, refer to the School of Engineering Technology bulletin, available at 120 Snell Engineering Center.

Minor in Computer Technology

To qualify for a minor in computer technology, the student must complete the following six courses and one laboratory. A student does not have to be enrolled in the School of Engineering Technology to declare the minor, but the student must meet the published prerequisites for all courses.

The required courses are: CT 1311, "C" Language; CT 1330, Data Structures; CT 1320, FORTRAN Lab; CT 1345, Assembly Language; CT 1340, Software Engineering; CT 1381, Operating Systems; CT 1393, UNIX.

Minor in Electrical Engineering Technology

To qualify for a minor in electrical engineering technology, the student must complete the following five courses and three laboratories. A student does not have to be enrolled in the School of Engineering Technology to declare the minor, but the student must meet the published prerequisites for all courses.

The required courses are: EET 1151, Circuit Analysis 1; EET 1152, Circuit Analysis 2; EET 1324, Circuit Lab 1; EET 1325, Circuit Lab 2; EET 1311, Electronics 1; EET 1312, Electronics 2; EET 1323, Electronics Lab; EET 1330, Energy Conversion; or EET 1377, Control Engineering 1.

Minor in Mechanical Engineering Technology

To qualify for a minor in mechanical engineering technology, the student must complete the following six courses and two laboratories. A student does not have to be enrolled in the School of Engineering Technology to declare the minor, but the student must meet the published prerequisites for all courses.

The required courses are: MET 1301, Mechanics A; MET 1302, Mechanics B; MET 1314, Stress Analysis A; MET 1370, Fluid Mechanics A; MET 1390, Measurements and Analysis Lab; MET 1340, Thermodynamics A; MET 1380, Materials A; MET 1391, Tech Lab A.

To obtain credit for a minor in engineering technology, students must file a petition form with the School of Engineering Technology in 120 Snell Engineering Center. Interested students should confer with an adviser as soon as possible. Advisers are Dean Thomas Hulbert and Mr. Roy Dalsheim, 120 Snell, 617-373-2500.

Aerospace Maintenance Engineering Technology

For transfer students the school offers a three-year Bachelor of Science in Engineering Technology degree with a major in aerospace maintenance engineering technology. This program, designed in conjunction with East Coast Aero Technical School, is for students who have successfully completed a program in aircraft and power-plant mechanics or similar technician programs.

To enter the program, students must pass college algebra, precalculus, calculus 1, and chemistry. During their three years of study, students participate in the cooperative education program.

These students have in their possession various federal licenses and qualify for exceptional cooperative education experiences with a number of aerospace firms involved with national defense and space exploration. They are especially sought after by co-op employers dealing with airframe integrity and power plant configuration.

Graduates of this program are prepared to pursue technical, support, or management positions in the aircraft industry. They may also become members of engineering teams in spacecraft or aircraft component manufacturing. Other graduates of the program may assume design/applications positions in either civilian or military aerospace markets.

Bachelor of Science Curriculum

Quarter 1	ENG 1110, Freshman English 1; GET 1170, Engineering Graphics 1; MTH 1194, Calculus 2; PHY 1191, Physics 1; and PHY 1196, Physics Lab 1.
Quarter 2	ENG 1111, Freshman English 2; GET 1171, Engineering Graphics 2; PHY 1192, Physics 2; PHY 1197, Physics Lab 2; and one social science/humanities elective.
Quarter 3	MET 1380, Materials A; MTH 1195, Calculus 3; PHY 1193, Physics 3; PHY 1198, Physics Lab 3; and one social science/humanities elective.

Quarter 4	ECN 1115, Principles of Macroeconomics; EET 1320, Electricity and Electronics 1; MET 1301, Mechanics A; CMN 1115, Foundations of Communication; and GET 1100, Computer Programming.
Quarter 5	ENG 1125, Technical Writing; MET 1302, Mechanics B; MET 1314, Stress Analysis A; and one social science/humanities elective.
Quarter 6	MET 1340, Thermodynamics A; MET 1370, Fluid Mechanics A; MET 1390, Measurement and Analysis Lab; MET 1481, Materials B; and one technical elective.
Quarter 7	MET 1341, Thermodynamics B; MET 1391, Technology Lab A; one technical elective; and two social science/humanities electives.

Computer Technology

Nonna K. Lehmkuhl, MEd, MS, *Coordinator for Computer Technology*

Computer technology's major functions include programming the computer for engineering, scientific, and business applications; designing, engineering, and testing computers; and interfacing computers with various types of equipment to enhance automation.

The computer technology program provides degree candidates with both academic and technical learning experience relevant to the hardware and software systems currently used in industry. Students also choose technical electives in their area of interest. High-level theory courses enable students to continue their educational and professional development beyond the baccalaureate level. Some students go on to pursue master's degrees in either business administration or information systems.

A typical sophomore's cooperative education responsibilities might include setting up and configuring various computer platforms, installing software packages, providing phone support for technical inquiries, and performing elementary network troubleshooting and some software research. Other typical positions explore the various aspects of manufacturing processes, including assembly and quality assurance.

As seniors, typical students have progressed to more sophisticated and challenging assignments. They may be assigned the responsibility of maintaining entire software applications as well as the databases for these programs, or they may be asked to convert old versions of application scripts to conform to new coding principles. Other assignments may include providing advanced technical software and hardware support for end users both on and off site.

Graduates of this program are equipped to play important roles on engineering support teams that implement engineering design projects. They also work closely with engineers as members of research and production teams.

Bachelor of Science Curriculum

Quarter 1	ENG 1110, Freshman English 1; GET 1170, Engineering Graphics 1; MTH 1191, College Algebra; PHY 1191, Physics 1; and PHY 1196, Physics 1 Lab.
Quarter 2	ENG 1111, Freshman English 2; GET 1100, Computer Programming for Engineering Technology; MTH 1192, Pre-Calculus; PHY 1192, Physics 2; and PHY 1197, Physics 2 Lab.
Quarter 3	CT 1150, Computer Organization; MTH 1193, Calculus 1; PHY 1193, Physics 3; PHY 1198, Physics Lab 3; and CMN 1115, Foundations of Communications.
Quarter 4	CT 1311, Programming in C Language; ECN 1115, Principles of Macroeconomics; EET 1151, Circuit Analysis 1; and MTH 1194, Calculus 2.
Quarter 5	CT 1315, FORTRAN Lab; CT 1330, Data Structures; EET 1152, Circuit Analysis 2; MTH 1195, Calculus 3; and one social science/humanities elective.
Quarter 6	CT 1335, Numerical Methods; CT 1340, Software Engineering; CT 1345, Assembly Language; and CT 1368, Semiconductor Logic.
Quarter 7	ENG 1125, Technical Writing; CT 1369, Computer Logic; CT 1374, Introduction to CPU Hardware; and CT 1381, Operating Systems.
Quarter 8	CT 1375, CPU Hardware Architecture; CT 1380, Data Communications; one computer technology elective; and one social science/humanities elective.
Quarter 9	CT 1355, Microprocessor Peripheral Hardware; CT 1480, Local Area Networks 1; two computer technology electives.
Quarter 10	CT 1356, Complex Peripheral Hardware; CT 1360, Industry Software; one computer technology elective; and one social science/humanities elective.
Quarter 11	CT 1351, Advanced Computer Organization; CT 1365, Industry Hardware; one technical elective; and one social science/humanities elective.

Electrical Engineering Technology

Ronald E. Scott, ScD, PE, *Coordinator for Electrical Engineering Technology*

The focus of electrical engineering technology is the design and operation of equipment and systems related to power, communications, data processing, and electrical control. Its major functions include generating, transmitting, and distributing electrical energy for light and power purposes; developing and producing equipment for telephone, radio, television, radar, and communication; designing and constructing data-processing systems and analog or digital computers; and applying electrical and electronic devices in the control of processes and manufacturing.

The program in electrical engineering technology offers theory courses at the upper end of the technology spectrum, and students may take technical electives in areas that interest them.

A sophomore may be given the cooperative education assignment of creating and editing electrical blueprints, doing shell drawings, or providing ductwork drawings along with the appropriate heat loading calculations for companies engaged in electrical construction. Other entry positions include assembly, bread boarding, inspection, and quality assurance.

Seniors typically have progressed to positions of much greater responsibility, such as installing and maintaining computer network systems, maintaining on-line base maps for public utility systems, and coordinating architectural and electrical plans with construction companies and suppliers. Students have also had co-op positions in consulting engineering firms as analysts, telemarketers in sales engineering, and environmental safety compliance officers.

Bachelor of Science Curriculum

Quarter 1	ENG 1110, Freshman English 1; GET 1170, Engineering Graphics 1; MTH 1191, College Algebra; PHY 1191, Physics 1; and PHY 1196, Physics Lab 1.
Quarter 2	ENG 1111, Freshman English 2; GET 1100, Computer Programming for Engineering Technology; MTH 1192, Pre-Calculus; PHY 1192, Physics 2; and PHY 1197, Physics Lab 2.
Quarter 3	GET 1171, Engineering Graphics 2; MTH 1193, Calculus 1; PHY 1193, Physics 3; PHY 1198, Physics Lab 3; and ECN 1115, Macroeconomics.
Quarter 4	CMN 1115, Foundations of Communication; EET 1151, Circuit Analysis 1; MTH 1194, Calculus 2; and one social science/humanities elective.
Quarter 5	EET 1123, Circuits Lab 1; EET 1152, Circuit Analysis 2; MET 1319, Mechanics; MTH 1195, Calculus 3; and one social science/humanities elective.
Quarter 6	EET 1125, Circuits Lab 2; EET 1311, Electronics 1; EET 1353, Circuit Analysis 3; EET 1360, Engineering Analysis 1; and ENG 1125, Technical Writing.
Quarter 7	EET 1310, Electrical Measurement; EET 1312, Electronics 2; EET 1323, Electronics Lab; EET 1354, Circuit Analysis 4.
Quarter 8	EET 1313, Electronics 3; EET 1327, Advanced Electronics Lab 1; EET 1330, Energy Conversion; one technical elective; and one social science/humanities elective.
Quarter 9	EET 1314, Pulse and Digital 1; EET 1328, Advanced Electronics Lab 2; EET 1337, Distributed Systems; one technical elective; and one social science/humanities elective.
Quarter 10	EET 1329, Advanced Electronics Lab 3; EET 1370, Digital Computers 1; EET 1377, Control Engineering 1; one technical elective.
Quarter 11	EET 1371, Digital Computers 2; EET 1378, Control Engineering 2; one technical elective; and one social science/humanities elective.

Mechanical Engineering Technology

George F. Kent, MS, PE, *Coordinator for Mechanical Engineering Technology*

As a technical field that deals with the use of machinery to harness power resources and perform useful work, mechanical engineering technology focuses on static forces, motion, and the kinetics of devices activated by hydraulic, electrical, mechanical, or thermodynamic forces.

Mechanical engineering technologists design and install machinery ranging from pocket watches to the largest energy-producing facilities. They help develop and produce engines and transport equipment such as automobiles, aircraft, ships, and railway cars. They also help construct and operate furnaces, boilers, and heating and air-conditioning equipment.

Students in mechanical engineering technology apply the principles of science and mathematics to their chosen fields and convert theories into practical techniques and processes. They learn how to communicate technical information effectively so they may become integral members of an engineer-technologist-technician design and operations team.

Sophomore mechanical engineering technology majors generally are referred to cooperative education positions such as technicians in facility or plant engineering departments, quality assurance positions in light and heavy manufacturing, and prototype development and design teams. A sophomore often will be given the responsibility of drawing mechanical designs and blueprints using various CAD software.

As seniors, these students have progressed to highly responsible positions in manufacturing and production, such as design and test technicians and field service engineers.

Bachelor of Science Curriculum

Quarter 1	ENG 1110, Freshman English 1; GET 1100, Computer Programming for Engineering Technology; GET 1170, Engineering Graphics 1; MTH 1191, College Algebra; PHY 1191, Physics 1; and PHY 1196, Physics 1 Lab.
Quarter 2	ENG 1111, Freshman English 2; GET 1100, Computer Programming for Engineering Technology <i>or</i> GET 1170, Engineering Graphics 1; MTH 1192, Pre-Calculus; PHY 1192, Physics 2; and PHY 1197, Physics 2 Lab.
Quarter 3	GET 1171, Engineering Graphics 2; MTH 1193, Calculus 1; PHY 1193, Physics 3; PHY 1198, Physics Lab 3; and ECN 1115, Macroeconomics.
Quarter 4	EET 1320, Electricity and Electronics; GET 1364, Kinematics; MET 1301, Mechanics A; and MTH 1194, Calculus 2.
Quarter 5	CHM 1130, Fundamentals of Chemistry; CHM 1138, General Chemistry Lab; MET 1302, Mechanics B; MET 1314, Stress Analysis A; and MTH 1195, Calculus 3.
Quarter 6	CMN 1115, Foundations of Communication; MET 1303, Mechanics C; MET 1315, Stress Analysis B; MET 1340, Thermodynamics A; and MET 1390, Measurement and Analysis Lab.
Quarter 7	ENG 1125, Technical Writing 1; MET 1341, Thermodynamics B; MET 1370, Fluid Mechanics A; MET 1380, Materials A; and MET 1391, Technology Lab A.
Quarter 8	MET 1330, Mechanical Design A; MET 1343, Heat Transfer; MET 1371, Fluid Mechanics B; MET 1392, Technology Lab B; and one social science/humanities elective.
Quarter 9	MET 1331, Mechanical Design B; MET 1393, Technology Lab C; MET 1396, Machine Shop; one technical elective; and one social science/humanities elective.
Quarter 10	GET 1356, Engineering Economy; MET 1394, Technology Lab D; MET 1481, Materials B or MET 1416, Stress Analysis C; one technical elective; and one social science/humanities elective.
Quarter 11	MET 1342, Refrigeration and Air-Conditioning; MET 1395, Technology Lab E; and two social science/humanities electives.

College of Nursing

Eileen H. Zungolo, MEd, EdD, RN, *Dean*

Carole A. Shea, MS, PhD, RN, CS, FAAN, *Associate Dean and Director of Graduate School*

Janet A. Carroll, MS, RN, *Assistant Dean of Administration*

Christine Letzeiser, MS, RN, *Assistant Dean of Student Affairs*

Associate Professors

Jane F. Aroian, MSN, EdD, RN

Olivia M. Breton, MEd, RN

Elaine L. Capozzoli, MA, PhD, RN

Margery M. Chisholm, MS, EdD, RN, CS

Ellen T. Daly, MS, EdD, RN

M. Paula Fellows, MS, RN

Patricia J. Hollen, MS, PhD, RN

Dorett Hope, MEd, EdD

M. Marcia Lynch, MSN, DNSc, RN

Geraldine A. Medici, MS, RN

Patricia Meserve, MS, PhD, RN

Susan J. Roberts, MS, DNSc, RN, ANP

Marilyn M. Smith, MS, MBA, RN

Mary E. Wilcox, MS, RN

M. Delaine Williamson, MS, MPH, RD

Assistant Professors

Anne Bateman, MSN, PhD, RN

Michelle Beauchesne, MS, DNSc, RN, PNP

Nancy N. Carr, MS, RN

Mary Anne Gauthier, MSN, EdD, RN

Carol Glod, MS, PhD, RN, CS

Elizabeth M. Howard, MS, PhD, RN, ANP

Barbara Kelley, MS, MPS, EdD, RN, PNP

Margaret A. Mahoney, MS, PhD, RN

Peggy Matteson, MS, PhD, RN

Kathleen Miller, MS, EdD, AN, ANP

Donna Newby, MSN, PhD, RN

Carol Williams, MS, DNSc, RN

Lecturer

Elaine Gardner, MS, RN

The College of Nursing offers a Bachelor of Science program designed to prepare students to become professional nurses for practice in a variety of health-care settings, such as hospitals, community health centers, schools, and homes. The college aims to provide all students—including those with diverse backgrounds and changing career goals—with a broad-based education which will foster ongoing personal and professional growth.

Nursing is both a science-based process and a caring art. The curriculum offers instruction in the sciences with opportunities in the humanities. Since nursing practice focuses on promoting, preserving, and restoring the health and well-being of individuals, families, groups, and communities across the life span, the curriculum emphasizes a community-based primary care approach, which starts in the freshman year and builds throughout the program. This approach requires knowledge, skills, and attitudes related to health care that is comprehensive, culturally sensitive, continuous, effective, compassionate, and collaborative. Because the vast majority of people's lives are spent in the community, a significant part of the clinical program takes place in the community where people live, work, eat, rest, play, vote, and pray. Recognizing the equally important need to prepare nurses to care for ill clients in institutions, the program provides ample opportunities for nursing practice in hospitals, rehabilitation centers, and long-term care facilities. The curriculum is capped by courses that enable students to put leadership and management skills into action, and to synthesize the complete role of the professional nurse in a clinical practicum.

In addition to completing academic coursework, students must meet the cooperative education requirement, which gives them the opportunity to integrate the theory and practice of nursing in selected settings. Through more than fifty community and institutional health-care agencies in Greater Boston, and across the country, students gain experience in providing nursing care to a variety of clients and families. Students learn that nurses have major roles in wellness and health promotion, acute care, and long-term care.

The baccalaureate nursing program provides the educational background needed for graduate study in nursing specialties. Successful completion of the baccalaureate program allows its graduates to take the National Council Licensing Examination (NCLEX-RN) to become registered nurses.

The program is accredited by the National League for Nursing and approved by the Board of Registration in Nursing of the Commonwealth of Massachusetts. Accreditation and approval indicate that the program meets educational standards for faculty, curriculum design, student quality, and overall University support. The college subscribes to the standards established by the American Association of Colleges of Nursing, of which it is a member.

Class Entrance Requirements

The requirements listed are for the Class of 1996 and beyond. Students completing the nursing program prior to 1996 are strongly encouraged to meet these academic standards. The minimum overall quality-point averages (QPA) listed are required at year's end for students to advance to the next level or to graduate.

Sophomore	1.6
Middler	1.8
Junior	2.0
Senior	2.0
To graduate	2.0

These averages reflect the minimum requirements for advancement; the faculty of the college highly recommends that students achieve higher grades in order to avoid academic difficulties as they progress through the program.

In addition, a grade of 2.0 or better is required in each nursing course. During the first year, nursing students must achieve a grade of C or better in BIO 1152, BIO 1153, and BIO 1154. The QPA for these science courses must be 2.0 before a student can enter the sophomore year. Other standards for progress, such as the minimum science QPA for the sophomore year, are published in the *College of Nursing Undergraduate Student Handbook* available at 211 Robinson Hall.

Special Requirements

Prior to entering, every student must have a physical examination, including a rubella titre and immunization for measles, mumps, rubella, and tetanus. Hepatitis B, PPD, and a chicken pox titre are required prior to clinical experience. Each year thereafter, the student must receive a health clearance. All students must carry malpractice insurance. Arrangements for this insurance are made by the University. Students in the College of Nursing are required to wear the approved school uniform in some clinical laboratory areas during academic quarters. A modification of the uniform is worn during cooperative education work experiences. All students assigned to a clinical nursing course must be certified in cardiopulmonary resuscitation (CPR); annual recertification is required. Students enrolled in the clinical courses must have access to a car to travel to assigned agencies.

Graduation Requirements

The College of Nursing reserves the right to amend courses, the program, and degree requirements to fulfill its responsibility as a professional program leading to licensure. The faculty has designed a curriculum to prepare nursing students for health care practice that addresses common goals to improve our nation's health. The new curriculum will be phased in for all classes beginning in the 1995-1996 academic year. Students continuing in the program in Fall 1995 must anticipate some changes in the courses to be offered and the program requirements from those printed in this undergraduate catalog. Degree candidates must complete all prescribed courses, a minimum of 176 quarter hours of credit. An overall science and nursing QPA of 2.0, with a C in all nursing courses and specified minimal grades as set forth in the policies of the college are required. Degree requirements are based upon the year of graduation, determined by the date of entry or re-entry into the College of Nursing. Degree requirements and the year of graduation for a student who does not make normal academic progress for more than two quarters will be subject to review and possible change. Candidates must meet the requirements of the Department of Cooperative Education and University residency requirements.

Transfer Student Track

The College of Nursing welcomes transfer students and students planning a career change who have a degree in another field, or who have completed a minimum of 45 quarter hours or transfer credits that are appropriate to curriculum requirements; these credits must include two anatomy and physiology courses and reflect a minimum overall QPA of 2.5. Students are accepted into this track for the fall quarter only. Once accepted, the transfer student follows a fixed curriculum plan that includes a minimum of three quarters of cooperative education experience. Students may complete baccalaureate program requirements in approximately two years and nine months.

RN to BSN Option

The college accepts registered nurses who wish to complete requirements for a Bachelor of Science in Nursing degree for either a full-time College of Nursing day option or the part-time University College evening section. The length of the program varies, depending on the individual's previous educational experience and ability to achieve advanced placement through selected methods. The RN to BSN curriculum option has been revised to reflect the need for community-based primary care learning experiences with emphasis on management and leadership. Students entering the program in Fall 1995 should anticipate changes in course offerings and program requirements that are designed to increase flexibility and facilitate learning for working nurses.

Bachelor of Science Curriculum

Quarter 1	BIO 1152, Integrated Anatomy and Physiology 1; ENG 1110, Freshman English 1; MTH 1101, Applications of Algebra; NUR 1106, Introduction to Professional Nursing; and COP 1370, Introduction to Career Management.
Quarter 2	BIO 1153, Integrated Anatomy and Physiology 2; ENG 1111, Freshman English 2; PSY 1111, Foundations of Psychology 1; and NUR 1107, Nursing Process and Skills.

Quarter 3	BIO 1154, Integrated Anatomy and Physiology 3; PSY 1271, Social Psychology, NUR 1102, Introduction to Human Nutrition; and NUR 1108, Nursing Health Assessment.
Quarter 4	BIO 1120, Basic Microbiology; SOC 1100, Introduction to Sociology; and NUR 1206, Promoting Healthy Childbearing and Childrearing.
Quarter 5	CHM 1106, General Chemistry for Health Professionals 2; NUR 1307, Influences in Health and Disease; and NUR 1208, Promoting Healthy Adulthood and Aging.
Quarter 6	NUR 1202, Pathophysiological Concepts for Clinical Nursing; NUR 1306, Promoting Health Restoration in Children; and PCL 1306, Pharmacology 1.
Quarter 7	ENG 1350, Intermediate Writing; NUR 1308, Promoting Health Restoration in Adults; and PCL 1307, Pharmacology 2.
Quarter 8	NUR 1408, Promoting Mental Health; PHL 1165, Moral Problems in Medicine; and SOC 1320 Introduction to Statistical Analysis 1.
Quarter 9	ECN 1130, Medical Economics; NUR 1406, Promoting Healthy Communities; and NUR 1502, Introduction to Research in Nursing.
Quarter 10	NUR 1508, Management and Leading in Nursing; one humanities elective; one computer elective; and one history elective.
Quarter 11	NUR 1507, Comprehensive Nursing Practicum; and three general electives.

Electives

The College of Nursing offers electives that enable students to satisfy their personal objectives. They include Independent Study; The Nurse Entrepreneur; International Health Care Practices; International Health Care Delivery; International Health Policy Issues; and Women's Health Choices and Decisions.

Alternative Freshman-Year Program

The Alternative Freshman-Year (AFY) Program is designed for students who need help in strengthening their basic study skills and abilities while they take the required freshman-year coursework in English, mathematics, and social sciences.

The program carefully monitors student participation in small classes that are based on supportive group-learning procedures. The program also provides participants with extensive help in clarifying their academic and career goals.

Through the combination of a carefully prescribed curriculum and the attention of faculty whose expertise is in developmental education, students follow a program that fits their individual needs. These same faculty teach the majority of the courses taken by AFY students, provide advice and support, and participate in a "House Plan" in which faculty members share information on each student's progress.

The program's flexibility not only helps AFY students gain confidence in their ability to do college-level work, but also allows them to consider several different areas of study before selecting a major. Students in this program are considered regular degree candidates with an undeclared major and enter their desired majors as sophomores.

In preparation for gaining sophomore status, AFY students follow one of three curriculum tracks: business, nonbusiness (including undecided) and health/science. With the exception of the health/science track, students may change either their intended major or curriculum track through the winter quarter of the freshman year without falling behind.

Students in the program have access to all physical education facilities and co-curricular programs. Alternative freshman-year students are encouraged to make extensive use of the Academic Assistance Center and the math and writing centers. The Counseling Center is available for personal and academic counseling as well as for vocational testing and counseling.

Class Entrance Requirements

To qualify for sophomore status in the College of Arts and Sciences, the College of Business Administration, and the College of Criminal Justice, AFY students must earn a quality-point average of 1.4 or higher and successfully complete forty-four programmed credits, as well as required courses. The College of Business Administration requires students to earn a 1.8 in the four core courses: ECN 4601, ENG 4014, MGT 4110, and MTH 1113.

Alternative freshman-year students may also qualify, on a space-available basis, for all majors in the Bouvé College of Pharmacy and Health Sciences with the exception of Physical Therapy, by following the AFY health/science curriculum track. Such students must complete fifty-nine programmed credits over four quarters, including three chemistry, two biology and two advanced math courses with a QPA of 3.0 or higher, with no grade below C in the science courses. Repeaters in the Alternative freshman-year program are not eligible for any majors in the Bouvé College.

AFY students who do not meet the requirements for sophomore status in their intended majors may return as "repeating freshmen" until they meet quality-point average and credit requirements for completing the freshman year in their particular program.

Tuition and Fees

Tuition and fees for the Alternative Freshman-Year Program are the same as for students in the full-time day programs. Payment of the standard tuition for the first three academic quarters entitles students to forty-eight credit hours of instruction. Thus, those who take the forty-four programmed credits are entitled to a four-quarter-hour tuition adjustment at the regular freshman rate.

Students following the health/science curriculum track are required to attend four consecutive quarters before qualifying for sophomore standing. However, such students incur no tuition charges for the fourth quarter of study, and thus have the same tuition costs as those in the business and nonbusiness tracks.

Business Track	Quarter 1	ED 4003, Integrated Language Skills Development A; ENG 4013, Fundamentals of English 1; HST 4110, History of Civilization A <i>or</i> ECN 4601, Economics 1; and MTH 1000, Math Preliminaries 1.*
	Quarter 2	ED 4004, Integrated Language Skills Development B; ENG 4014, Fundamentals of English 2; HST 4110, History of Civilization A <i>or</i> MGT 1115, Introduction to Business; and MTH 1010, Math Preliminaries 2.*
	Quarter 3	ECN 4601, Economics 1 <i>or</i> 2; MGT 4110, Survey of Business and Management; HST 4111, History of Civilization B; MTH 1113, Math for Business*; and a directed elective <i>or</i> ENG 1111, Freshman English 2.
Arts and Sciences, Criminal Justice, or Education Track	Quarter 1	ED 4003, Integrated Language Skills Development A; ENG 4013, Fundamentals of English 1; MTH 1000, Math Preliminaries 1*; and SOC 4010, Principles of Sociology 1 <i>or</i> HST 4110, History of Civilization A.
	Quarter 2	ED 4004, Integrated Language Skills Development B; ENG 4014, Fundamentals of English 2; HST 4110, History of Civilization A <i>or</i> SOC 4010, Principles of Sociology 1; and MTH 1010, Math Preliminaries 2.*
	Quarter 3	ENG 1111, Freshman English 2 <i>or</i> a directed elective; HST 4111, History of Civilization B; POL 4106, Introduction to Politics; and SOC 4011, Principles of Sociology 2; <i>or</i> an elective.
Health Sciences Track	Quarter 1	CHM 1110, General Chemistry Preliminaries; ED 4001, Integrated Language Skills Development 1; ENG 4013, Fundamentals of English 1; and MTH 1010, Math Preliminaries 2.*
	Quarter 2	CHM 1111, General Chemistry 1; ED 4002, Integrated Language Skills Development 2; ENG 4014, Fundamentals of English 2; and MTH 1106, Fundamentals of Mathematics.*
	Quarter 3	BIO 1140, Basic Animal Biology 1; CHM 1106, General Chemistry 1 <i>or</i> CHM 1122, General Chemistry for the Life Sciences; ENG 1111, Freshman English 2 <i>or</i> a directed elective; and a directed elective.
	Quarter 4	BIO 1141, Basic Animal Biology 2; MTH 1107, Functions and Basic Calculus*; and a directed elective.

*In each curriculum, students will be placed in a mathematics course based on testing results.

Course Descriptions

Arts and Sciences

Please note some courses in the College of Arts and Sciences are duplicated in different departments or colleges, or within a department. You may not receive credit for two such courses. If you have a question about whether one course does overlap with another, please consult the departments involved and the Office of the Dean before taking the course.

Numbers in parentheses within course descriptions refer to core curriculum categories listed on page 31.

African-American Studies

AFR 1100 Introduction to African-American Studies 4 QH

Explores several of the possible historical, sociological, cultural, and political avenues of study in the broad interdisciplinary spectrum of African-American studies. Provides an introductory overview of the field and will offer an opportunity to identify areas for more specific focus.

AFR 1131/HST 1525 African-American History I 4 QH

Covers the development of black America from the period of slavery through Reconstruction, with emphasis on the historical links between Africa and America and the impact on black development in the United States. (III)

AFR 1132/HST 1526 African-American History 2 4 QH

Examines the development of black America from Reconstruction to the present, and the effects of events in the United States and world history on the development of black America. Emphasizes contemporary issues and how these issues can be seen through a historical perspective. *Prereq.* AFR 1131 or permission of instructor.

AFR 1133 History of Blacks in the Media and the Press 4 QH

Offers a historical and visual examination of the development of the African-American experience in the American mass media and press. Analyzes contemporary and historical literature, films, and people with respect to history, racism, images, psychology, and social movements. Newspapers, film, television, and radio are prime focal points, and are used to help form strategies for the future of black Americans.

AFR 1141 Education Issues and Minority Communities 1 4 QH

Focuses on some of the important issues in today's urban elementary and secondary education systems. The analysis will look at the historical development of these issues, and students will be encouraged to think about and discuss the issues' future significance.

AFR 1151/ART 1218 Survey of African-American Art 4 QH

Offers a historical and critical examination of African-American art from the nineteenth century to the present, with special emphasis on the effects of European and African art styles on the black artist in America. (II)

AFR 1153/MUS 1104 Survey of African-American Music 4 QH

Studies the impact of African rhythm on black music, the New Orleans coalescence, regional development, ragtime, the emergence of large bands, the harmonic revolution of the forties,

bebop, the 1960s avant-garde, and subsequent developments. Some analysis of specific jazz phenomena is included.

AFR 1155 Foundations of Black Culture 4 QH

Studies music, literature, visual and performing arts, and other cultural and artistic traditions as they have evolved among African, African-American, and Caribbean peoples.

AFR 1156/MUS 1181 Music of Africa 4 QH

Provides a broad survey of the musical traditions of Africa with respect to their historical, social, and cultural backgrounds. Musical organization, musical practice, and aspects of style will all be discussed in light of possible contributions to contemporary African-American music.

AFR 1161/ECN 1170 Economic Issues in Minority Communities 4 QH

Examines minority life-styles, perspectives, self-images and social position in the urban community, particularly in terms of the application of basic economic theories to the economic realities of minority communities. (VI)

AFR 1171 Contemporary Black Politics 4 QH

Analyzes the evolution of black political thought in America and examines the socio-political contests that have served as catalysts to modern black political movements.

AFR 1191/HST 1620 Early African Civilization 4 QH

Studies the ancient empires of Africa, especially Ghana, Songhai, Mali, Zimbabwe, the city states of East Africa, Nubia, Egypt, Ethiopia, and the Congo Kingdom.

AFR 1193 Africa Today 4 QH

Studies the complex political and social picture of Africa. This course examines some of the salient features of black art, politics, and identity in Africa.

AFR 1195 Identity and Nationalism in Africa 4 QH

Studies how centuries of imperialism, the struggle for national unity, and the continuing problems of racism and rivalry between factions have affected the present identities and nationalist movements in Africa. This course explores problems peculiar to Africa and to any group of nations struggling against colonial ideas. Tribalism and the effects of European colonial partition on African identity are discussed.

AFR 1196 The Black Experience in the Caribbean 4 QH

Offers a descriptive and interpretive analysis of the growth of the modern black community in the Caribbean. Although the focus will be on the contemporary period, the course will examine that period in the context of colonialism and slavery in the Americas. Important racial, social, political, economic, and religious issues will be addressed.

AFR 1197/HST 1621 Modern African Civilization 4 QH

Explores African history and culture from 1800 to the present era. Emphasis will be placed on the relationship between Europe and Africa, the circumstances surrounding the imperialist partition of Africa, and the decolonization process. (IV)

AFR 1211 African-Americans in Science, Technology, and Medicine 4 QH

Studies the contributions that African-Americans have made to the development of science and technology in America. It examines the cultural and social factors that have encouraged blacks to work in the fields of science (biology, chemistry, physics) and technology (engineering and medicine). Certification of blacks within the American scientific community and the availability of science to the past and contemporary African-American communities are also explored. Readings, discussions, individual research topics, and interviews with black scientists, inventors/engineers, and doctors are used to develop the basic course material.

AFR 1220 The Black Novel 4 QH

Focuses on the black novelist's place in the history of American fiction. Special attention is given to Chesnutt, Toomer, Wright, Ellison, and contemporary novelists, and to their different perceptions of the black experience in America.

AFR 1231/LIN 1231 African-American English 4 QH

Addresses topics in the study of African-American English. Investigates the hypotheses about the origins of African-American English as well as arguments about the relation of the dialect to English and other languages. Considers issues regarding the use of the dialect in the educational context.

AFR 1235 Black History of Boston 4 QH

Examines the social, economic, political, and educational history of Boston's black community in the nineteenth and twentieth centuries. The development of the black community and its institutions is a major focus, and students are encouraged to study the past in an attempt to understand the present and interpret the future. Research data include participant observation, oral history, interviews, and primary and secondary source materials.

AFR 1240 Contemporary Issues in Black Society 4 QH

Introduces the various issues and problems that confront black Americans, including some of the realities of the social, political, and economic problems of contemporary black experience. Students are asked to assess the validity of specific social theories in relation to the black experience. (VI)

AFR 1241 The Black Family 4 QH

Studies how the black family functions, both interpersonally and as a social unit. Anthropological and sociological theories deal with variations in family structure and the function of the black family in black society. The effects of slavery and colonization on the black family structure and functions are also explored. A side issue is a discussion of some of the differences and similarities between African, African-American, and African-Caribbean families.

AFR 1248 Race Relations in America 4 QH

Examines the interrelations of ethnic, cultural, and minority groups in the United States. Focus is on the nature of racial conflicts, discrimination, reverse discrimination, personal and institutional racism, and racial and ethnic stereotyping. Discussion considers avenues of improvement in attitude awareness and change.

AFR 1249 Black Community and Social Change 4 QH

Explores the dynamic changes experienced by black communities in the United States since the Civil Rights era in the 1950s and 1960s. Includes discussions and applications of key concepts and methods in several fields of the social sciences, and seeks to understand the relationship of race, class, gender, and social

change in addressing the current search for policies and programs for community development.

AFR 1251 Survey of Black Theater and Drama 4 QH

Focuses on the development of black drama during the nineteenth and twentieth centuries, with emphasis on modern developments and their political and cultural significance. Same as THE 1118.

AFR 1261 The Economics of Urban Poverty 4 QH

Focuses on the migration of blacks to central cities in America. Unlike other migrants to urban centers, blacks were not assimilated into the social/economic mainstream, and there is evidence of flagrant job, housing, and educational discrimination against them even during periods of affluence. During recession or depression, their problems were compounded. Students have the opportunity to survey the above events from an economic framework.

AFR 1280/PSY 1280 Black Psychological Identity 4 QH

Provides an interdisciplinary look at the social, political, and psychological factors shaping contemporary African-American identity. Explores several different factors that interact with blackness to shape the diversity of African-American experience, such as skin color, gender, culture, and class. Studies black identity as it has been conceptualized, measured, and researched by psychologists. Readings include essays written by important African-American thinkers, fiction and autobiographical narratives, as well as empirical research in the field of psychology.

AFR 1294 Third World Political Relations 4 QH

Offers a comparative regional analysis of the political systems of third world nations of Africa, Asia, Latin America, and the Caribbean. Emphasis is on development strategies; problems of development, including national identity, political socialization and participation, national defense, and urbanization; and the positions of third world nations in the international community.

AFR 1295 Politics of South Africa 4 QH

Examines contemporary political developments in South Africa. Focuses on the historical development of the system of racism called apartheid and the liberation movements, and the struggle for a democratic South Africa. Explores the role of the United Nations, the Organization of African Unity, the United States, and other international organizations and countries.

AFR 1297/HST 1605 Caribbean History 4 QH

Analyzes the development of the Caribbean from slavery to the present. The focus will be on the period 1918-1962 especially, and emphasis will be on the historical analysis of the relationship of the Caribbean with the United States and black Americans.

AFR 1300, AFR 1301, AFR 1310, AFR 1311 Directed Study 4 QH each

Offers the ambitious student the opportunity to pursue a special intellectual interest not covered by the department course offerings and to work on this interest with the department faculty member of his/her choice. The faculty member will closely supervise the project and act as adviser for the duration of the quarter.

AFR 1342/POL 1342 Crisis and Conflict in Black Africa 4 QH

Explores contemporary politics in African nations south of the Sahara using films, maps, news clips, discussions, and readings. Studies South Africa, Nigeria, Kenya, and Ethiopia. Examines apartheid, colonialism, Afro-Marxism, chieftaincy, economic development, and Pan-Africanism. (VI)

AFR 1350 Research Seminar**4 QH**

Provides students the opportunity, first, to identify a substantive area of their concern (for example, welfare, political leadership, education) and to define a related problem in a research context; second, to be supervised in designing a research methodology most appropriate for examining the problem area; and third, to conduct extensive research, test the hypothesis, and draw conclusions based on data analysis techniques.

AFR 1355 Directed Study for Senior Thesis**4 QH**

Offers students the opportunity to prepare a professional research paper under the close supervision of a scholar interested in students' particular research areas. The senior thesis is required of all African-American Studies majors. *Prereq. Permission of instructor.*

AFR 1380 Junior/Senior Honors Program**4 QH**

For details contact the honors office.

AFR 1401 History of East Africa**4 QH**

Deals with the precolonial period and the problems of the partition of Africa in the first section of the course. The second section focuses on the classical colonial period and the transformations of colonial policy after World War II, with particular emphasis on the ambiguity of decolonization and those features of the colonial system that seem to have become a part of the East African social and political environment.

AFR 1403/HST 1623 History of West Africa**4 QH**

Studies the history of West Africa and its struggle for internal unity, economic development, and social justice. The Pan-Africanist ideology, W.E.B. DuBois's writings, African socialism, and the consolidation of power and leadership are some of the topical objectives in this study of African liberation, particularly the rise of West Africa.

AFR 1405/HST 1625 History of South Africa**4 QH**

Studies pre-colonial South Africa and the conflict between Africans and the Dutch and English settlers. The course then focuses on the formation and transformation of colonial policy after World War II, with particular emphasis on racism, neo-colonialism, liberation movements, and international involvement in the apartheid system. (VI) *Prereq. AFR 1491 or permission of instructor.*

AFR 1415/LIN 1415 African Language**4 QH**

Seeks to prepare students for serious theoretical and practical study of the West African language and literature known as Kwa, the largest language subgroup in the Niger-Congo family. Students will explore the classification of African languages, the application of basic linguistics, and the history of these languages in Africa and the Western hemisphere, all leading to an introduction to spoken Yoruba and Igbo.

AFR 1421 African-American Literature 2**4 QH**

Continues AFR 1127. Focuses on principal writers and their major themes. *Prereq. AFR 1127 or permission of instructor.*

AFR 1448 Religion in Black American Society**4 QH**

Examines the impact of religion on social structures, group behaviors, moral codes, and belief patterns in black society. Topics include the church as a social organizer, the role of the black minister in the community, and the variety of black denominations in urban and rural areas.

AFR 1451 Seminar: Creative Expression in Blues and Jazz**4 QH**

Explores African sources of inspiration for the musical literature of blues and jazz. Focuses on blues and jazz as a reflection of African-American life and on the impact these musical forms have had on black self-image and position in American culture.

AFR 1470 Black Political Thought**4 QH**

Examines black opinions, from the radical to the ultra-conservative, of the United States political system. The focus is historical in context and will address notions of political socialization and the development of black political ideologies.

AFR 1500 Topics in African-American Studies**4 QH**

Examines closely topics of interest to students of African-American Studies, including political leadership, intellectual history, cultural and artistic expression, community development, and recent social and economic trends.

AFR 1810, 1811, 1812, 1813 Junior/Senior Honors Project**4 QH each**

For details contact the honors office.

The following courses may be of interest to the student wishing to concentrate in African-American Studies. Descriptions for these courses may be found in the appropriate department listing.

PHL 1100 Introduction to Philosophy**PHL 1140 Social and Political Philosophy****PHL 1243 Existentialism****PHL 1335 Moral Philosophy****POL 1303 Political Behavior****POL 1362 Civil Liberties****POL 1386 International Law****SOA 1345 People in Cities****SOC 1147 Urban Social Problems****SOC 1170 Race and Ethnic Relations****SOC 1310 Class, Power, and Social Change**

American Sign Language—English Interpreting

ASL 1101 American Sign Language 1**4 QH**

Introduces American Sign Language and deaf culture, focusing on frequently used signs, basic rules of grammar, nonmanual aspects of ASL, introductory fingerspelling, and some cultural features of the Deaf community.

ASL 1102 American Sign Language 2**4 QH**

Continues basic language and culture study. Offers an opportunity to build receptive and expressive ASL vocabulary. Topics include the use of signing space; and further use of nonmanual components, including facial expression and body postures. *Prereq. ASL 1101, or permission of instructor.*

- ASL 1201 Intermediate American Sign Language 1** 4 QH
Emphasizes further development of receptive and expressive skills, fingerspelling, vocabulary building, grammatical structures; encourages more extensive use of non-manual behaviors, classifiers, body postures, and signing space. Introduction to regional and ethnic sign variations and political and educational institutions of the Deaf community. *Prereq.* ASL 1102, or permission of instructor.
- ASL 1202 Intermediate American Sign Language 2** 4 QH
Offers intensive practice involving expressive and receptive skills in story telling and dialogue. Introduces language forms used in ASL poetry and the features of culture as they are displayed in art and the theatre. *Prereq.* ASL 1201, or permission of instructor.
- ASL 1211 Deaf Culture** 4 QH
Focuses on the status of Deaf people as a linguistic and cultural minority group. Topics include the role of American Sign Language in the Deaf community; educational and historical perspectives on deafness; and sociological and cultural make-up of the Deaf community. *Prereq.* ASL 1201, or permission of instructor.
- ASL 1212 Deaf History** 4 QH
Surveys the history of Deaf people in the Western world, with emphasis on the American Deaf community, their language, education, and relationship to hearing society. *Prereq.* ASL 1101, or permission of instructor.
- ASL 1250/LIN 1250 Linguistics of American Sign Language** 4 QH
Introduces the basic issues in linguistics by examining the structural properties of American Sign Language and comparing it with other languages having similar properties. Includes phonology (formational properties of signs), morphology (word formation rules, derivation, and inflection, complex verbs, classifiers, verb modulations), semantics (the meaning structure of signs), and syntax (the structure of ASL utterances in terms of old versus new information and the structure of ASL narratives). *Prereq.* ENG 1118, and the ability to follow lectures in ASL.
- ASL 1301 Advanced American Sign Language Proficiency** 4 QH
Emphasizes vocabulary building and mastery of fine points of grammar through rigorous receptive and expressive language activities. Explores a variety of signing styles and registers. Includes student-led discussions, debates, and reports on topics in Deaf culture, society, and current affairs. *Prereq.* ASL 1202, or permission of instructor.
- ASL 1302 Advanced American Sign Language Proficiency 2** 4 QH
Continues ASL 1301. *Prereq.* ASL 1301 or permission of instructor.
- ASL 1401 American Sign Language Literature** 4 QH
Examines and discusses various genres of American Sign Language. This course will concentrate on the work of current, recognized narrators in both literary and face-to-face storytelling traditions, and will also include selected autobiographical sketches, lectures, stories, and letters from the early 1900s by such historical figures as Clerc, Veditz, E.M. Gallaudet, Hotchkiss, and others. A videotaped research essay in ASL will be required at the end of the course. *Prereq.* ASL 1202 or permission of instructor.
- ASL 1500 Introduction to Interpreting** 4 QH
Presents an overview of the interpreting profession: responsibilities, ethics, and aptitudes of interpreters; professional associations; law and business of interpreting; the bilingual and bicultural context; basic translation and interpretation; environment and audience; special populations; freelance versus in-house positions; and evaluation and certification. *Prereq. or concurrent:* ASL 1211 and ASL 1301. *Majors only or permission of instructor.*
- ASL 1505 ASL–English Interpreting 1** 4 QH
Presents an overview of theoretical models. Examines the processes of translating and interpreting through practice of requisite skills and process tasks, and by applying skills and theory. *Prereq.* ASL 1302 with a grade of B or better and ASL 1500. *Majors only or permission of instructor.*
- ASL 1506 ASL–English Interpreting 2** 4 QH
Continues the study of interpreting, including practice of requisite skills and process tasks of increased complexity. Focuses on consecutive interpreting by applying process skills, contrasting ASL–English linguistics, and contrasting cultural analysis. *Prereq.* ASL 1505 with a grade of B or better. *Majors only or permission of instructor.*
- ASL 1507 ASL–English Interpreting 3** 4 QH
Continues the study of interpreting, including practice of requisite skills and process tasks of increased complexity. Focuses on simultaneous interpreting through applying process skills, contrasting group dynamics, and analyzing discourse. *Prereq.* ASL 1506 with a grade of B or better. *Majors only or permission of instructor.*
- ASL 1520 Interpreter Role and Ethics** 4 QH
Explores ethical standards and dilemmas in ASL–English interpreting and other professions through discussions, hypothetical situations, and role playing. Includes topics such as culturally objective standards, ethics and professional principles, power relations within groups, and the Registry of Interpreters for the Deaf code of ethics. *Prereq.* ASL 1500. *Majors only or permission of instructor.*
- ASL 1521 Contrastive Analysis** 4 QH
Examines and contrasts the major linguistic features of ASL and English. The standard division of morphology, phonology, syntax, semantics, and register is reintroduced, and the various elements of both languages that fall under these divisions are compared point by point. *Prereq.* ASL 1522 or permission of instructor.
- ASL 1522 Discourse Analysis for Interpreters** 4 QH
Presumes that the sentence is not the largest linguistic unit in all languages, including ASL, and that linguistic structures do not exist in isolation, but rather join together in a communicative process. Explores how discourse, such as conversations and texts, is structured, and emphasizes the discourse strategies of ASL. *Prereq.* ASL 1250 or ASL 1302 or permission of instructor.
- ASL 1801, ASL 1802, ASL 1803, ASL 1804, ASL 1805** 4 QH each
Directed Study
Offers students an opportunity to go beyond course work of the regular curriculum or to pursue an individual learning project. May include research, practicum, or language development activity.
- ASL 1810 Special Topics in Interpreting** 4 QH
Provides students with an overview of interpreting for populations with particular needs and preferences as well as interpreting in settings where specific knowledge bases are required. Populations settings will rotate and may include elderly, children, and foreign Deaf adults, as well as deaf-blind, multihandicapped, visual-gestural, educational, high-tech, and performing arts settings. *Prereq.* ASL 1506. *Majors only or permission of instructor.* *May be taken twice for credit.*

ASL 1820 Interpreting Practicum**4 QH**

Features practical interpreting experience in agencies serving Deaf people. Focuses on linguistic and ethical questions and dilemmas in a biweekly seminar format. Requires six hours per week in an agency. *Prereq.* ASL 1507 and ASL 1520, both with a grade of B or better. *Majors only or permission of instructor. May be taken twice for credit.*

Anthropology

SOA 1100 Peoples and Cultures**4 QH**

Surveys concepts in anthropology (the study of culture). Analyzes a range of societies in terms of such sociocultural institutions as kinship, gender relations, economics, politics, and religion. Examines important political and economic processes, such as colonialism and development, affecting cultures around the world.

SOA 1101 Cultural Meaning and Everyday Life**4 QH**

Studies the underlying patterns of meaning that are below the surface of everyday thought and behavior. Examines daily routines, leisure activities, joking and humor, speech patterns, popular culture, current folklore and mythology, nonmonetary economic transactions, kinship and friendship, and religion and ritual.

SOA 1104 Cultures of the World**4 QH**

Explores cultural differences among peoples in societies around the globe and analyzes how diverse cultural patterns can be studied and described. (II)

SOA 1120 Camera and Culture: Visual Anthropology**4 QH**

Explores how cultures are portrayed on film. Examines anthropologists' use of film to gather information and represent other peoples. Also examines how filmmakers from postcolonial societies have addressed the respective cultures, the experience of colonialism, and the nature of film-making and film/video consumption in the third world. When possible, a production experience is included. (IV)

SOA 1125 Stones and Bones: Prehistory in the New World**4 QH**

Surveys the New World prehistoric cultures. Focuses on examining the work of archaeology and ethnohistory in a range of societies in both South and North America. Pays particular attention to social, political, and economic factors and how these work to promote such things as state formation, regional political alignment, and social differentiation. Studies the Incan, Mayan, and Aztec states, as well as the big game hunting traditions of the Plains, the forming communities of the Southwestern United States and Mississippi River area.

SOA 1146 Rural Workers in the Third World**4 QH**

Surveys the lives of rural peoples in the contemporary Third World. Focuses on people's organizing efforts to improve their living and working conditions. Uses case studies from Latin America and China. (IV)

SOA 1155 Individual and Culture**4 QH**

Explores the ways in which individuals are shaped by society and the ways in which they can effect change.

SOA 1160 Sex, Sex Roles, and Family**4 QH**

Examines popular and scientific notions about sex, gender relations, family, and kinship. Examines why our images of family,

masculinity, and femininity are not universal by analyzing the patterns of sex roles, sexual practices, and kinship in other cultures. Discusses how and why relations between men and women change during times of socioeconomic and political change.

SOA 1185 War and Aggression**4 QH**

Evaluates, by using anthropological investigations, the assumption that aggression is part of human nature and linked to sex differences. Discusses cross-cultural variation in violent behavior and warfare in the context of wider political and economic processes. Analyzes the widespread belief in innate masculine aggression as it relates to contemporary societal violence and militarism.

SOA 1220 Culture and Mental Illness**4 QH**

Discusses and analyzes the nature and meaning of culture, the role of culture in personality formation, culture and anxiety, anthropological approaches to the "normal" and the "abnormal," and the question, "Is mental illness psychological fact or cultural fiction?"

SOA 1275 Musical Culture: Notes in the Modern World**4 QH**

Explores issues of class, ethnicity, gender, sexuality, and age in the cross-cultural context of music as expressed in performances, recordings, videos, literary, and ethnographic materials. The course will also examine the social production and consumption of music. Expects students to conduct a series of field exercises.

SOA 1301 Human Origins**4 QH**

Offers an intensive look at the data on fossil remains and contemporary primates, which are essential for an understanding of human physical and behavioral evolution. Efforts are made to bring the student into direct contact with primary materials. (II)

SOA 1303 Sexuality and Culture**4 QH**

Examines sexuality in a cross-cultural perspective including issues of sexual identity, the relationship of sexuality to the life cycle, sexual ideologies, and the links between sexuality and the reproduction of cultural norms. Topics include cross-cultural variation in sexual expression, sex and reproduction as commodities, sexuality and violence, sexually transmitted diseases and social policy. Compares sexuality issues in the United States to those of other cultures.

SOA 1310 Global Markets and Local Cultures**4 QH**

Discusses selected topics in the socioeconomic transformation of other cultures, including urbanization, industrialization, commodity production, and international labor migration. Focuses on the impact of capitalist development on contemporary third world and postcolonial societies; examines local responses to those changes.

SOA 1320 Anthropology Methods**4 QH**

Examines theory and practice of methods of field research and data analysis. Gives students the opportunity to take part in a field project.

SOA 1335 Language and Culture**4 QH**

Focuses on the anthropological study of linguistics. Presents basic theories of sociolinguistics and explores language in its social context. Includes animal communication; language learning; language and mind; cognitive and symbolic anthropology; the ethnography of speaking, speech, and boundaries; multilingualism; language and gender; language and ethnicity; language and social class; and pidgins and Creoles. Includes several field assignments.

SOA 1345 People in Cities 4 QH

Studies urban life and urban problems, using international case studies. Addresses rural/urban and international migration, the relationship of urban settlement to employment patterns, the creation of inner-city or suburban ghettos or squatter settlements, and movements for city services in areas of spontaneous growth. Gives students the chance to design and implement a field project.

SOA 1425 Cultural Survival 4 QH

Examines the problems faced by today's tribal peoples and national minorities. Using cross-cultural case studies, analyzes the relationship of governmental policies and economic development priorities to the survival of self-identified tribal cultures and minority populations throughout the world. Examines human rights, nationalism, and cultural autonomy, resistance, and self-determination.

SOA 1430 Latin American Society and Development 4 QH

Explores the processes of social, economic, and cultural change in Latin America. While concentrating on the present, traces class formation, agrarian structures, ethnic identity, ceremonial organization, gender roles, and political conflict since the colonial era in a range of countries. Emphasizes the relationship of communities and national political and economic systems. May emphasize Central America and Mexico or countries in South America through case studies. (IV)

SOA 1431 Native North Americans 4 QH

Explores North American Indian tribes including the Dakota (Sioux), Navajo, Pueblo, Mohawk, and Penobscot, and examines the historical changes that led to their contemporary situation. Focuses on the reservation and its many problems from various viewpoints.

SOA 1470 Religion and Myth 4 QH

Focuses on nature and institutionalization of primitive, ancient, and contemporary religions. Explores religious concepts and movements in relation to social, religious, and political organization.

SOA 1704 Cultures of the World (Honors) 4 QH

Honors equivalent of SOA 1104.

SOA 1800, SOA 1801 Directed Study 4 QH each

Offers independent work on a chosen topic under the direction of members of the department. *Prereq.* Senior standing and department approval.

SOA 1820, SOA 1821, SOA 1822, SOA 1823 4 QH each**Junior/Senior Honors Project**

For details contact the honors office.

SOA 3100 Theory 4 QH

Graduate school course open to qualified undergraduates with permission of instructor.

Art and Architecture

ART 1100 History of Art to 1400 4 QH

Provides a survey of Western art from prehistoric times to the Renaissance.

ART 1101 History of Art Since 1400 4 QH

Surveys Western art from the Renaissance to the twentieth century.

ART 1106 Introduction to Art 4 QH

Offers an introduction to the characteristics of the visual arts, including painting, sculpture, graphic arts, and architecture. Studies various examples of works of art as an introduction to style and technique. Includes visits to museum collections and contemporary art galleries. (II)

ART 1111 Introduction to Architecture 4 QH

Introduces the history, theory, and practice of architecture. Shows how architects in different historical periods have balanced the demands of function, construction and aesthetics. Concentrates on specific design problems found in churches, houses, skyscrapers, and cities.

ART 1124 Basic Drawing 4 QH

Offers intensive drawing instruction. Focuses on developing a formal understanding of the structure of objects and figures as well as increased dexterity with a variety of drawing tools. Includes experiments with materials such as wash, charcoal, and pencil.

ART 1127 Basic Painting 4 QH

Presents an introductory studio course in the fundamental techniques of painting. Formal problems in the study of color, light, space systems, form, and composition establish the foundation for more individual creative expression. Uses critiques and slide lectures as needed.

ART 1130 Visual Studies Foundation 1 4 QH

Offers an introductory lecture/studio course clarifying basic principles, language, and concepts inherent in visual language systems. Concentrates on two-dimensional media including photography, painting, video, and film as related to the fundamentals of composition, space relationships, effects of color, form, pattern repetition, structure, figure-ground relationships, balance, and unity.

ART 1131 Visual Studies Foundation 2 4 QH

Explores three-dimensional form. Examines principles including mass, volume, line, plane, and texture. Introduces basic materials and structure through constructing models and prototypes. Presents sequential exercises with simple eye/hand skills and form recognition. Explores complex projects that require an understanding of context, content, and developing original forms. *Prereq.* ART 1124 and ART 1130.

ART 1132 Principles of Graphics 4 QH

Offers intensive study in graphic form principles through assigned problems, critiques, and lectures that emphasize formal and conceptual understanding. Develops the visual problem-solving process including comprehending problem objectives, working to specifications, investigating alternatives, and presenting professionally crafted solutions. *Prereq.* ART 1130 or permission of instructor.

ART 1133 Graphic Design 1 4 QH

Introduces applied graphic design. Explores photographic image making and manipulation, as well as letterform and type, as approaches to visual problem-solving. Emphasizes formal relationships and investigates concept development through sequence and series. Refers to visual books, graphic system, and moving images. *Prereq.* ART 1132, ART 1134, and ART 1160.

ART 1134 Typography 1 4 QH

Introduces letterforms in visual communication. Studies typography as form, typographic contrast principles, text organization and

hierarchy, the typographic grid, legibility, and letterspacing. Explores the history and variety of typefaces. Includes assigned projects, readings, and lectures. *Prereq.* ART 1130 or permission of instructor.

ART 1144 Typography 2 4 QH
Builds on the letterform, typography, and grid studies begun in ART 1134 and applies them in a series of projects that focus on text type, legibility, readability, structure, and contrast in publication design and in typographic approaches to information design. *Prereq.* ART 1134.

ART 1150 Architectural Design 1 4 QH
Introduces conceptual thinking about the design of the built environment. Recent studio work has included analyses of seminal modern houses, design projects for memorials, idea-based houses, and the urban landscape. Focuses on integrating imagination into solving these design problems. *Prereq.* ART 1156 or GE 1103.

ART 1151 Architectural Design 2 4 QH
Introduces the structure and order of architectural thinking. Includes projects such as compositional exercises, formal analysis, and additions to important modern buildings. Studies the analytical tools for understanding the relationship of building elements to the ideas that inform them. *Prereq.* ART 1150.

ART 1156 Architectural Drafting 4 QH
Introduces architectural drafting techniques, tools, materials, lettering, and dimensioning. Students will be expected to make orthographic, axiometric, one- and two-point perspective drawings.

ART 1160 Introduction to Photography 4 QH
Explores the basics of black and white photography. Introduces the 35mm camera, negative processing, and black and white printing in the department's state-of-the-art lab. No camera nor previous photography experience required.

ART 1170 Filmmaking Workshop 4 QH
Introduces students to the nature and creative uses of video. Examines video's technological foundation, conventions, and aesthetic potential. Emphasizes weekly hands-on lab assignments and substantive final project. Includes lectures, screenings, and critiques. Facilities and equipment are provided by the department.

ART 1180 Video Basics 4 QH
Introduces the fundamental nature of the video medium and its creative use. Examines the technological foundation of video, the established conventions of effective field and studio production techniques and postproduction techniques (electronic editing), and explores the aesthetic potential of both the visual and auditory aspects of video. Emphasizes weekly hands-on lab assignments with a final substantive video project required of each student. Facilities and equipment are provided.

ART 1190 Introduction to Computer Graphics 4 QH
Introduces visual problemsolving with computers. Emphasizes the medium's special properties and its potential. *Prereq.* ART 1130 and ART 1131 or permission of instructor.

ART 1203 Medieval Architecture 4 QH
Studies the major religious and secular buildings of the Early Christian, Byzantine, and Gothic periods, emphasizing Gothic architecture of France and England.

ART 1204 Renaissance Architecture 4 QH
Focuses on architecture and urban form in Italy between 1400 and 1600, with some emphasis on Renaissance architecture in France and England.

ART 1205 Renaissance Art 4 QH
Examines Italian painting and sculpture from the early fourteenth century to the end of the sixteenth century, with emphasis on the art of the great painters and sculptors of the period such as Botticelli, Donatello, Leonardo, Michelangelo, and Titian. The art will be considered in the context of the social, political, philosophical, and religious issues of the time. (III)

ART 1210 Nineteenth Century Painting 4 QH
Examines European painting and related arts including the neo-classical, romantic, realist, and impressionist movements. Emphasizes French painting, but also considers important developments in England and other western European countries. (III)

ART 1213 Modern Art 4 QH
Traces the development of painting, sculpture, and related arts from European avant-garde in the late nineteenth century to the international market of the late twentieth century. Topics include challenges to traditional boundaries between media, the development of abstraction and the idea of pure form, and the recent emergence of a post-modern aesthetic.

ART 1216 Survey of African Art 4 QH
Traces the historical development of African art from traditional to contemporary styles and periods. Emphasizes the study of art objects, the social and historical context in which aesthetic issues are shaped, and the impact of religion and external forces on creativity. Uses lectures, critique, discussions, fieldwork, and hands-on interaction with art objects.

ART 1218 African-American Art History 4 QH
Offers a historical and critical examination of African-American art from the nineteenth century to the present, with special emphasis on the effects of European and African art styles on the black artist in America.

ART 1220 American Art 4 QH
Surveys the history of American painting and sculpture from the seventeenth century to the present. Focuses on the cultural forces that shape the evolution of art in America. Includes frequent museum visits.

ART 1223 American Architecture 4 QH
Introduces American architecture, town planning, and urban design from the 1700s to the 1930s. Considers European influences and uniquely American contributions. (III)

ART 1225 Modern Architecture 1 4 QH
Surveys the development of modern architecture in England, France, Germany, and the United States from the mid-eighteenth to the late nineteenth century. Discusses architecture and urban design as a cultural response to society's changing conditions. Considers such themes as symbolism, morality, rationalism, and functionalism. *Prereq.* ART 1111 or permission of instructor.

ART 1226 Modern Architecture 2 4 QH
Examines the forms and principles of European and American architecture of the twentieth century, emphasizing the work of such key figures as Frank Lloyd Wright, Mies van der Rohe,

Le Corbusier, and Louis Kahn; and such influential movements as the Dutch de Stijl, Russian constructivism, and American post-modernism.

ART 1230 History of Photography 4 QH

Explores photography from its origins in the early nineteenth century to its maturity in the mid-twentieth century. Surveys technological developments but emphasizes the emergence of photography as an expressive medium and its relation to other modern art forms.

ART 1233 Contemporary Directions in Photography 4 QH

Studies prevailing trends in photographic artistic expression from the beginning of the twentieth century to the present. Examines the importance of photographic imagery in relation to our surroundings through lecture and slide presentations.

ART 1235 History of Film 4 QH

Surveys major international developments in film from the late nineteenth century to the present. Examines national movements, technological and aesthetic innovations, important figures, and significant films. Includes films, lectures, and discussions.

ART 1236 American Film 4 QH

Surveys the rise of the American film from the late nineteenth century to the present. Examines key films, directors, major themes, and film forms and techniques. Includes lectures, screenings, and discussions.

ART 1237 Contemporary Directions in Cinema 4 QH

Provides a comparative study of major international film movements from World War II to the present. Studies selected films by representative contemporary directors. Includes lectures, screenings, and discussions.

ART 1240 History of Graphic Design 4 QH

Considers the history, context, and issues of graphic design through lectures, readings, discussions, and projects. *Prereq.* ART 1101.

ART 1243 Graphic Design 2 4 QH

Investigates the expressive visual potential of words and images. Explores visual poetry, the connotations of mark and form choice, and applied semiotics. Includes assigned projects, readings, discussions, and lectures. *Prereq.* ART 1133 and ART 1250.

ART 1244 Graphic Design 3 4 QH

Introduces problem-solving methodologies and applies them to complex communications problems. Uses research, teamwork, and brainstorming to define the problems, and develops and formally refines the solutions. *Prereq.* ART 1243.

ART 1250 Color Theory and Practice 4 QH

Focuses on the optical phenomena of color and their application in visual communication. Studies hue, value, and saturation, and their implications for color activity, legibility, and spatial illusion in traditional and electronic media.

ART 1252 Architectural Design 3 4 QH

Addresses the issue of building typology. Offers students the opportunity to learn to use, as models in their own work, the formal, organizational, and cultural similarities of buildings from throughout history with similar uses. Gives meaning to the study of architectural history and allows history to inform the current design process. *Prereq.* ART 1151.

ART 1253 Architectural Design 4 4 QH

Studies the effect of external circumstance on the architectural process. In addition to studying historical urbanism, students will work with ideas about landscape and aesthetic frameworks that can govern projects from without. Projects are studied at several scales, from the aerial map to the building detail. *Prereq.* ART 1252.

ART 1254 Intermediate Drawing 4 QH

Focuses on heightening the student's understanding of spatial awareness, scale movement, and expression. Students will be asked to create unusual environmental situations for their figurative compositions. A variety of media will be used, including wash, pen and ink, watercolor, chalk, charcoal, and pencil. *Prereq.* ART 1124 or equiv.

ART 1256 Theory of Structures 1 4 QH

Introduces the theory of materials and structures. Examines basic structural elements in masonry and wood construction. Uses historic and current building types to explore the relationship between structure, materials, construction process, and architectural space. Includes lectures, discussions, field trips, and student presentation of structural models and diagrams. *Prereq.* PHY 1222.

ART 1257 Theory of Structures 2 4 QH

Continues ART 1256, combining the basic structural elements to develop structural systems. Explores form, stability loading, and materials in relation to the design of foundation, structural steel, reinforced concrete, timber, frame, space frame, and shell systems. *Prereq.* ART 1256 and PHY 1222.

ART 1261 Intermediate Black and White Photography 4 QH

Emphasizes combining personal aesthetic choices with refined darkroom skills. A second-level black and white photography studio/lab course. The zone system for roll film cameras, toners, fiber based papers and alternative film choices will be demonstrated and assigned. A final portfolio is required for successful completion of the course. Lab fee. *Prereq.* ART 1160 or equivalent.

ART 1263 Introduction to Color Photography 4 QH

Introduces shooting, processing, and printing color negative films. Lectures cover basic color theory in relationship to photography as well as contemporary color photographic processes. Working with color negative films, students get hands-on experience in the C-41 process for developing film and the EP-2 process for printing color negatives. Weekly assignments emphasize solving technical and aesthetic problems inherent in dealing with color negative materials. Hands-on labs allow students to produce final projects. Color chemistry and facilities are provided. *Prereq.* ART 1160 or equivalent.

ART 1264 Color Photography 2 4 QH

Allows students to explore and develop their personal photographic style with an emphasis on experimentation. A second-level color course. Studies historical perspective of color photography contrasted with contemporary color work. Offers students the opportunity to develop the necessary foundation for critical analysis of their own work through required reading. Includes weekly assignments and critiques. Students will develop a cohesive portfolio of photographs. *Prereq.* ART 1263.

ART 1280 Media Graphics 4 QH

Offers applied video design projects. Develops visual logic, sequence, motion, and legibility. Includes assignments, demonstrations, and lectures. *Prereq.* ART 1180 and ART 1243.

ART 1281 Video Project

Offers in-depth exploration of the video medium. Students research, write, and produce a documentary, fictional narrative, or experimental video project. Emphasizes innovation, personal authorship, effective research, sound conceptual development, formal and technical skills, and imaginative and creative soundtracks and visuals in video. *Prereq.* ART 1180 or equivalent.

ART 1285 Interarts

Introduces the dynamics of interdisciplinary art in a team-taught course. Interarts presents contemporary art forms existing outside the established traditions of fine arts. Art concepts investigated include time, systems, kinetics, environments, phenomenology, politics, and collaborations. A hands-on, project-oriented course where upper level students work in small groups to explore the interrelationships of media utilizing light, sound and video within installation, performances, dances, and events. Exposes students to a range of contemporary subjects through video/slide presentations, live performances, selected readings, and lectures by visiting artists. *Prereq.* ART 1124, ART 1130, ART 1131 or permission of instructor.

ART 1290 Electronic Publishing Design

Investigates publication and periodical design issues including concept development, sequence, organization, page design, typography, and the typographic grid. Includes assignments using page layout software in the computer labs. *Prereq.* ART 1132, ART 1134, and ART 1190 or equivalent.

ART 1291 Intermediate Computer Graphics Workshop

Offers the opportunity to pursue individual projects and assigned studies in the computer environment. *Prereq.* ART 1190 and ART 1243 or permission of instructor.

ART 1295 Computer-Aided Design

Introduces CAD processes for two- and three-dimensional modeling for architectural design. Studies computer-aided design techniques that support site and program analysis concept and schematic design, and design development and construction drawing applications. *Prereq.* ART 1190 or equivalent.

ART 1296 Advanced Studio in Computer Visualization

Continues ART 1295. Offers detailed, hands-on instruction in computer modeling and rendering. Offers students the opportunity to learn to manipulate two-dimensional, three-dimensional, and video images using IBM computers and AutoCAD. Includes topics such as ray tracing, solid modeling, and image synthesis. *Prereq.* ART 1295.

ART 1310 Seminar in Modern Architecture

Explores contemporary issues in architectural theory, design, and practice. Examines historical forces and contemporary criticism to define the nature of modernism and post-modernism. Focuses on such architects as Louis Kahn, IM Pei, Philip Johnson, Robert Venturi and Denise Scott-Brown, Michael Graves, and Frank Gehry. *Prereq.* ART 1226 or permission of instructor.

ART 1324 Thesis in Art History

Focuses on the production of a 20–30 page thesis. Students undertake individual research, under the direction of a faculty member, on art-historical topics appropriate to their personal and professional interests. Conceived for art majors who are completing the BA degree and whose primary interest is in art history. *Prereq.* ART 1100, ART 1101, 20 QH in other art history courses, departmental permission.

4 QH

ART 1330 Advanced Visual Communication

Presents an advanced interdisciplinary studio seminar in visual and media design. In a chosen area of specialization, students explore their capabilities through the practical application of conceptual and technical skills. Lab fee. *Prereq.* ART 1144 and ART 1244 or permission of instructor.

4 QH

ART 1341 Architectural Design 5

Studies the construction and fabrication process. Students will have the opportunity to study the impact of these processes on their thinking as designers. Explores the relationship between schematic ideas and materials and their connections. Projects include detailed drawings and large scale models. *Prereq.* ART 1253.

6 QH

ART 1342 Architectural Design 6

Requires students to integrate previously acquired knowledge in the resolution of a specific building program for a specific site. Provides students with the opportunity to investigate the relationship between the different aspects of design and how it leads to the resolution of architectural forms. Incorporates the issues of context, tectonics, and typology into the design of a single building. *Prereq.* ART 1341.

6 QH

ART 1352 Architectural Thesis

The final studio course. Adds the element of problem identification to problem solving already covered in the previous architectural design studio sequence. Each student must frame his or her own architectural problem and then formulate a response to that problem. Students are expected to arrive with a project proposal over the first two weeks and spend the remainder of the term developing the project. *Prereq.* ART 1342.

6 QH

ART 1355 Environmental Systems

Surveys the environmental systems of power, air, water, waste, and light as integral elements of architecture. Discusses the theory and practice of these systems in architectural design. Considers historical and contemporary examples of building systems that illustrate the function, technology, and aesthetics of environmental systems. Includes field trips, lectures, and individual student research projects. *Prereq.* ART 1252.

4 QH

ART 1363 Advanced Photography Seminar

Provides close interaction between student and teacher. Students are asked to refine their technical skills and to make meaningful decisions about their relationship to the world around them through the use of black and white and/or color photography. Portfolio preparation, alternative processes, and large format will be combined to form a base of skills with which to present the student's work to a larger photographic community. Stresses individual direction and a qualitative approach to substantive photography. *Prereq.* Permission of instructor.

4 QH

ART 1713 Modern Art (Honors)

Combines in-depth investigation of selected modern artists and movements with an overview of the diverse meanings and functions of modern art. Involves developing and presenting individual research projects. *Prereq.* Honors status or permission of instructor.

4 QH

ART 1800, ART 1801, ART 1802 Directed Study

Offers independent work under the direction of members of the department on a chosen topic. *Prereq.* Junior or senior art major and department approval.

4 QH each

ART 1803, ART 1804, ART 1805 Directed Study 6 QH each

Offers independent work under the direction of members of the department on a chosen topic. *Prereq.* Junior or senior art major and department approval.

ART 1810, ART 1811, ART 1812, ART 1813 4 QH each
Junior/Senior Honors Program

For details contact the honors office.

Biology

Courses are presented in three categories: non-science majors; health-related science and other non-biology science majors; and biology majors. Two or more courses with substantially the same content may not be counted toward quantitative graduation requirements. If a student is not sure whether particular courses overlap it is his/her responsibility to get advice from a departmental advisor.

The following courses are primarily for non-science majors. These courses are not open to biology majors.

BIO 1111 Environment and Man 4 QH

Offers an ecological analysis of man's interaction with other organisms. Presents the necessary foundation of biological principles. (II)

BIO 1171 Focus on the Sea: Issues and Nature 2 QH

Explores marine conservation issues through lectures, discussion, and field trips to coastal habitats and islands. Studies the sea from ecological, economic, and literary perspectives.

BIO 1175 Introduction to Marine Biology 4 QH

Offers a broad introduction to the field emphasizing principles of oceanography and marine biology. Presents the physical, geological, and biological aspects of the ocean. Discusses the diversity of marine life and how organisms interact within different marine communities. Lab fee.

BIO 1181 The Human Organism 4 QH

Introduces the structure and function of the human body. Emphasizes the principles of biological and physical science as they relate to life processes in health and disease. Lab experiments explore the workings of the students' own biological systems rather than those of other animals. Lab fee.

BIO 1187 Biology of Human Reproduction 4 QH

Studies the sexual and reproductive function in the human male and female, including sexual development, coitus, fertilization, pregnancy, birth, and lactation. Discusses the methods of controlling fertility and sexually-transmitted disease. Analyzes factors affecting reproduction and sexuality in various human populations.

The following courses are primarily for majors in science- or health-related professions. These courses, where indicated, are not open to biology majors.

BIO 1106 General Biology 4 QH

Focuses on universal properties and processes of living organisms. Topics include cellular composition and cellular control, heredity, the evolutionary process, and environmental relationships. Lab fee. (Overlaps BIO 1103 and BIO 1140.)

BIO 1107 Animal Biology 4 QH

Offers a systematic comparative study of the structure and functions of animals. Considers the diversity of animals from the standpoint of evolutionary adaptation. Lab fee. (Overlaps BIO 1104 and BIO 1141.) *Prereq.* BIO 1106.

BIO 1115 Introduction to Human Biology 4 QH

Introduces students to cell biology, genetics, and animals, especially parasites, that cause health problems. Lab fee. *Not open to biology majors.*

BIO 1120 Basic Microbiology 4 QH

Microbial life, emphasizing morphological characteristics, physiological activities, and disease production. Lab fee. (Overlaps BIO 1320 and BIO 1121.) *Prereq.* BIO 1140, or permission of instructor; not open to biology majors.

BIO 1121 Introductory Microbiology 3 QH

Same as BIO 1120, but without lab. *Not open to biology majors.*

BIO 1140 Basic Animal Biology 1 4 QH

Covers principles of biology; universal properties and processes of living organisms as exemplified by the cell and its activities, inheritance, evolution, and environmental relationships. Lab fee. (Overlaps BIO 1103 and BIO 1106.)

BIO 1141 Basic Animal Biology 2 4 QH

Offers systematic, comparative study of the structure and functions of animals. Considers the diversity of animals from the standpoint of evolutionary adaptation. Lab fee. (Overlaps BIO 1104 and BIO 1107.) *Prereq.* BIO 1140.

BIO 1150 Functional Human Anatomy and Physiology 1 5 QH

Covers cell and tissue structure and function, anatomical terminology, and the anatomy and physiology of bones, muscles, and the nervous system. Lab includes the study of human bones and muscles, pig dissection, and muscle and nerve physiology. Lab fee. (Overlaps BIO 1152.) *Not open to biology majors.*

BIO 1151 Functional Human Anatomy and Physiology 2 5 QH

Covers anatomy and physiology of the respiratory, digestive, urogenital, endocrine, and cardiovascular systems, and a brief exploration of the anatomy and physiology of the eye and ear. Lab includes studies of sensory physiology, enzymes, metabolism, and cardiovascular, respiratory, and urinary function. Lab fee. (Overlaps BIO 1153 and BIO 1154.) *Prereq.* BIO 1150; not open to biology majors.

BIO 1152 Integrated Human Anatomy and Physiology 1 4 QH

Introduces students to human anatomy and physiology. Focuses on cell and tissue structure and function; and anatomy and physiology of skin, bones, muscles, and blood. Lab includes pig dissection. Lab fee. (Overlaps BIO 1150.) *Not open to biology majors.*

BIO 1153 Integrated Human Anatomy and Physiology 2 4 QH

Presents the structure and function of the following systems: nervous, endocrine, and reproductive. Lab includes pig dissection. Lab fee. (Overlaps BIO 1151.) *Prereq.* BIO 1152; not open to biology majors.

BIO 1154 Integrated Human Anatomy and Physiology 3 4 QH

Presents the structure and function of the cardiovascular, respiratory, urinary, and digestive systems and the regulation of metabolism and body temperature. Lab includes pig dissection. Lab fee. (Overlaps BIO 1151.) *Prereq.* BIO 1153; not open to biology majors.

The following courses are primarily for biology majors but are open to other students with appropriate prerequisites and permission of the instructor.

BIO 1103 Principles of Biology I **5 QH**

Introduces basic biological principles. Topics include: the first human retrovirus; the nature of scientific thought and knowledge; launching the antibiotic era; diabetes and the discovery of insulin; the cellular pathway of insulin secretion; DNA science; the principles of inheritance, and others. Integrates topics into discussions of disease and pathological processes and how fundamental biological principles form the foundation of medical science. Lab involves demonstrations and hands-on practice of the concepts discussed in lecture. Lab fee.

BIO 1104 Principles of Biology 2 **5 QH**

Introduces the diversity of animals through presentation of their systematic relationships, structure and function, and ecological roles. Cellular, tissue, and organismal levels are included. Supplemented with laboratory observations. Lab fee. *Prereq.* BIO 1103.

BIO 1105 Principles of Biology 3 **5 QH**

Examines the biology and diversity of plants and plant-like organisms. Explores the relationships between humans and plants by looking at plants through three different perspectives: 1) Feeding a Starving World; 2) Curing a Sick World; and 3) Engineering a Better World. Employs case studies to highlight major themes. Lab involves demonstrations and hands-on practice of the concepts discussed in the lecture. Lab fee. *Prereq.* BIO 1103 or BIO 1106.

BIO 1211 Environmental and Population Biology **4 QH**

Considers physical and chemical factors of the environment as they affect the distribution of organisms and as they may in turn be affected by the organisms. Includes population dynamics, species interactions, population genetics (lightly), the development of communities, and the structure and function of ecosystems. Lab fee. *Prereq.* BIO 1105, BIO 1106, BIO 1107 or BIO 1103, BIO 1104, BIO 1105, and CHM 1111.

BIO 1260 Genetics and Developmental Biology **4 QH**

Focuses on elaboration of the classic laws of heredity, cytogenetics, molecular basis of heredity, and selected examples of the development of form and function. Lab fee. *Prereq.* BIO 1103-BIO 1105 or BIO 1105-BIO 1107, and CHM 1264.

BIO 1261 Introductory Biochemistry **4 QH**

Topics include structure and function of biomolecules, central concepts of bioenergetics and thermodynamics, enzyme kinetics and regulation, and metabolic pathways. Lab fee. *Prereq.* BIO 1103-BIO 1105 or BIO 1106, BIO 1107 and BIO 1260, CHM 1221, and CHM 1265.

BIO 1270 Diving Research Methods **4 QH**

Introduces students to techniques in the study, ecology, and physiology of subtidal marine organisms. Focuses on underwater research methods, their appropriate applications, and their implementation during field exercises under water. Topics to be covered include diving physiology, sampling design, experimental design, statistical analysis of data, population censusing methods, under water measurements of hydrodynamics, in situ respirometry, underwater telemetry, underwater photography, and the use of underwater habitats and submersibles in research. Lab fee. *Prereq.* Scuba certification.

BIO 1311 Evolution **4 QH**

Discusses history of evolutionary theory and lines of evidence. Emphasis is placed on mechanisms of speciation. Introduces current evolutionary topics. Laboratory involves students in library research. *Prereq.* BIO 1104 or BIO 1107 and BIO 1211, and BIO 1260.

BIO 1312 Marine Ecology **4 QH**

Studies marine habitats and organisms. Focuses on primary and secondary productivity, and community structure and dynamics. Emphasizes through field work the Pacific Northwest intertidal and shallow subtidal communities. East/West program, Friday Harbor. *Prereq.* Two years of college biology.

BIO 1320 General Microbiology **5 QH**

Introduces morphological, ecological, and biochemical consideration of representative groups of bacteria. Introduces virology and microbial genetics; host-parasite relationships, prokaryotes of medical significance; and physical and chemical controls of microbial growth. (Overlaps BIO 1120.) Lab fee. *Prereq.* BIO 1103, BIO 1104, BIO 1105, CHM 1111, and CHM 1122; or permission of instructor.

BIO 1330 Marine Botany **4 QH**

Explores taxonomy of the major groups of marine plants, primarily algae. Investigates ecological and reproductive strategies, economic importance, and roles in diverse marine communities. Mandatory field trips in addition to lab. Lab fee. *Prereq.* BIO 1103, BIO 1104, BIO 1105.

BIO 1332 Molecular Marine Botany **4 QH**

Introduces modern biochemical and molecular approaches used to examine systematic and evolutionary problems at the species level and above. Offers extensive hands-on laboratory experience in isozyme electrophoresis, DNA isolation, and restriction fragment analysis. Expects students to conduct individual projects, applying techniques they have learned to topics dealing with the local seaweed and seagrass flora. Lab fee. *Prereq.* BIO 1330.

BIO 1341 Vertebrate Zoology **4 QH**

Presents systematics, behavior, ecology, and zoogeography of all classes of vertebrates. Laboratories consist of study of vertebrate specimens and field trips to observe species in their habitats. Lab fee. *Prereq.* BIO 1104 or BIO 1107.

BIO 1342 Biology of Crustacea **4 QH**

Studies systematics, morphology, and biology of the smaller Crustacea. Focuses on non-malacostracan orders, but includes those malacostracan taxa dominated by small forms. Lab fee. *Prereq.* BIO 1370 or GEO 1428 or permission of instructor.

BIO 1347 Embryology **5 QH**

Topics include gametogenesis, fertilization, cleavage, gastrulation, induction, organogenesis, and metamorphosis in vertebrates. Emphasis is on frog, chick, and pig in the lab. Lab fee. *Prereq.* BIO 1107 or BIO 1105, and BIO 1260.

BIO 1348 Animal Histology **4 QH**

Offers microscopic study of fundamental types of animal tissues. Lab fee. *Prereq.* BIO 1104 or BIO 1107.

BIO 1350 Regulatory Cell Physiology **5 QH**

Introduces physiological control systems including transport processes, cellular basis of nerve function, action of chemical

messengers and regulators, and principles of cellular contraction and motility. Lab fee. *Prereq.* BIO 1103 and BIO 1104, or BIO 1106 and BIO 1107.

BIO 1351 Comparative Vertebrate Anatomy 5 QH
Examines the morphology and phylogeny of fossil and living vertebrates. Lab work consists of the dissection of the shark, mud puppy, and the cat. Lab fee. *Prereq.* BIO 1105 or BIO 1107.

BIO 1370 Marine Invertebrate Zoology 5 QH
Topics include functional morphology, systematics, ecology, and phylogenetic relationships of the major invertebrate phyla. Lab emphasizes utilization of living marine forms, with dissection of representative organisms. Lab fee. *Prereq.* BIO 1105 or BIO 1107.

BIO 1371 Biological Oceanography 4 QH
Offers labs and lectures encompassing the principles of biological oceanography. Topics include physical and chemical aspects of the ocean environment, the distribution, production, and interactions of marine planktonic organisms, and ecosystem characteristics of specific oceanographic environments. Emphasizes participation in sampling and analysis using current instrumentation and methods. Lab fee. *Prereq.* BIO 1104 or BIO 1107.

BIO 1412 Benthic Marine Ecology 4 QH
Examines the interactions among bottom-dwelling invertebrates, fish, and plants and their environment. Quantitative field methods and new developments in ecological theory will be applied to examinations of the rocky intertidal zone, soft sediment areas, salt marshes, and the rocky subtidal zone. Lab fee. *Prereq.* BIO 1211; BIO 1370 recommended.

BIO 1413 Tropical Terrestrial Ecosystems 3 QH
Introduces students to the plants, animals, and ecosystems of terrestrial Jamaica. East/West Program. *Prereq.* Two years of college biology.

BIO 1420 Microbial Physiology 4 QH
Focuses on structure and function of the bacterial cell, emphasizing its general properties as well as on the physical and chemical factors that influence it. Lab fee. *Prereq.* BIO 1320 or equivalent.

BIO 1427 Medical Microbiology 4 QH
Emphasizes host parasite interactions: virulence, toxins, natural flora, immunological responses; characteristics of the common bacterial, rickettsial, and protozoal infections in humans; epidemiology, pathology, vaccines, and chemotherapy. Lab fee. *Prereq.* BIO 1320 or equivalent.

BIO 1430 Plant Physiology 4 QH
Focuses on the physiology and biochemistry of plants as a whole and at the cellular and organ levels. Considerations of mineral metabolism and nutrition, photosynthesis, hormones, growth, and development are included. Attendance at a weekly four-hour lab, as well as preparation of a paper based on the research literature, is required. Lab fee. *Prereq.* BIO 1105 and CHM 1265.

BIO 1432 Higher Plants 4 QH
Studies the origin and evolution of land plants since their invasion of the land surface in late Silurian and early Devonian times, approximately 405 to 370 million years ago; compares early and modern land plants and discusses their evolution; examines the flower as a reproductive structure. Lab fee. *Prereq.* BIO 1105.

BIO 1437 Plant Development 4 QH
Examines the structural and molecular aspects of plant development beginning with the fertilization apparatus of higher plants and the development of the embryonic plant. Studies the structure and development of the vegetative and reproductive organs of the plant. Applies the advances in the fields of cellular and molecular biology to the interpretation of plant development. Students progress from learning fundamental information on each topic through reading contemporary research papers. Student projects are the focus of the laboratory. Lab fee. *Prereq.* BIO 1105.

BIO 1440 Advanced Invertebrate Zoology 4 QH
A lecture, field, and lab course that concentrates on one or two phyla. Subject varies from year to year, depending upon expertise of available faculty. An individual research project is required. Lab fee. *Prereq.* Two years of college biology.

BIO 1441 Parasitology 4 QH
Examines the symbiotic relationships of parasitic protozoans, flatworms, nematodes, and arthropods. Lab fee. *Prereq.* BIO 1107 or BIO 1104, and BIO 1260.

BIO 1442 Vertebrate Paleontology 4 QH
Examines evolution of the vertebrates, including humans, as revealed through the fossil record. Lab, museum, and field studies. Lab fee. *Prereq.* BIO 1107 or BIO 1105, BIO 1211, BIO 1260; or permission of instructor.

BIO 1444 Wildlife Biology 5 QH
Presents concepts and techniques utilized in the conservation and study of wild vertebrates in lecture, laboratory, and weekly field trips. Subjects include habitat management, endangered species, exotic species, zoonoses, financing, and legislation. Lab fee. *Prereq.* BIO 1104 or BIO 1107, BIO 1211, and BIO 1341.

BIO 1446 Ornithology 4 QH
Discusses anatomy, physiology, behavior, ecology, and systematics of birds. Laboratories include study of specimens and field identification. Lab fee. *Prereq.* BIO 1104 or BIO 1107, and BIO 1211.

BIO 1447 Herpetology 4 QH
Emphasizes the natural history, behavior, systematics, and zoogeography of recent amphibians and reptiles. Lab consists of identification and study of specimens, particularly local species. Mandatory field trips. Lab fee. *Prereq.* BIO 1105 or BIO 1107, and BIO 1260.

BIO 1448 Mammalogy 5 QH
Discusses anatomy, physiology, behavior, ecology, and systematics of mammals. Laboratories involve study of specimens, field collection, and museum preparation, including a weekend field trip. Lab fee. *Prereq.* BIO 1104 or BIO 1107, and BIO 1211.

BIO 1449 Marine Birds and Mammals 4 QH
Focuses on the phylogeny, systematics, zoogeography, morphology, physiology, reproduction, behavior, and ecology of birds and mammals associated with the marine environment, with lab emphasis on species that occur along the New England coast. Labs include identifying, dissecting, and preparing specimens. Lab fee. *Prereq.* BIO 1211 and BIO 1104 or BIO 1107.

BIO 1450 Immunology 4 QH
Provides an overview of the structure and function of genes, proteins, and cells involved in the generation of the immune

response. Emphasizes molecular immunology and immunogenetics. *Prereq.* BIO 1261. *Take concurrently with BIO 1467.*

BIO 1453 General Physiology of Invertebrates 4 QH
Surveys basic animal functions as manifested among the major groups of invertebrates, with comparisons to the vertebrates, especially aquatic vertebrates. Considers the cellular and biochemical bases for the functions, their control, their adaptiveness to diverse environments, and their evolutionary implications. Topics usually include respiration, circulation, nutrition, metabolism, excretion, salt and water balance, temperature responses, biological clocks, sensory organs, and various effector organs. Lab fee. *Prereq.* BIO 1261 or BIO 1350.

BIO 1454 Systems Physiology 4 QH
Covers function and regulation of major physiological systems in animals including energy metabolism, thermoregulation, muscle and movement, circulation, respiration, salt and water balance, and circadian rhythms. Emphasizes vertebrates but material on invertebrates will be included where appropriate. Lab fee. *Prereq.* BIO 1261 or BIO 1350 or permission of instructor.

BIO 1457 Neuroethology 4 QH
Concentrates on the mechanisms underlying behavior of model invertebrates and lower invertebrates in a lecture, field, and lab course. Aims to develop a framework to explain behavior in terms of properties and connectivity of neuronal circuits. Topics include: the cellular biology of neurons and neuronal circuits, the organization of sensory and motor systems, and field and lab analysis of simple behaviors. Lab fee. *Prereq.* BIO 1105.

BIO 1460 Current Concepts in Cell Biology 4 QH
Examines selected topics in cellular structure and function of eukaryotes, for example, compartmentalization and its underlying physical and biochemical processes. Topics vary. Lab fee. *Prereq.* BIO 1261.

BIO 1461 General Biochemistry 1 4 QH
Surveys biochemistry, emphasizing protein structure, the nature of enzymic catalysis, bioenergetics, and the metabolism of carbohydrates, lipids, nucleotides, and amino acids. *Prereq.* BIO 1260 and organic chemistry.

BIO 1462 General Biochemistry Laboratory 4 QH
Introduces modern research techniques used in biochemistry and molecular biology. Topics include purification and characterization of proteins, kinetic properties of enzymes, isolation of high molecular weight DNA, recombination of DNA molecules in vitro, isolation of bacterial clones containing recombinant molecules, and in vitro mutagenesis. Covers safety and moral concerns raised by genetic engineering. Includes two lab periods and one lecture per week. Lab fee. *Prereq.* BIO 1261 or concurrent with BIO 1461.

BIO 1463 Cellular Biochemistry 3 4 QH
Emphasizes the structure and function of organelles, mechanisms of signal transduction, and regulation of gene expression. *Prereq.* BIO 1261 or BIO 1461.

BIO 1467 Molecular Biology 4 QH
Studies current theories of the detailed molecular mechanisms for the preservation, expression, and evolutionary development of biological information. Emphasizes experimental design and proof in macromolecular chemistry and genetics. *Prereq.* BIO 1261 or BIO 1461.

BIO 1470 Ocean and Coastal Processes 1 4 QH
Includes studies of the open ocean, rocky intertidal areas, sandy beaches, and estuarine environments of the Washington coast. Demonstrates basic biological principles through comparative studies. The first of a series of three courses intended to introduce the student to a wide range of coastal environments. East/West Program. *Prereq.* Two years of college biology.

BIO 1471 Ocean and Coastal Processes 2 4 QH
Includes studies of the open ocean, rocky intertidal areas, sandy beaches, and estuarine environments of the Caribbean. Demonstrates basic biological principles through comparative studies. The second of a series of three courses intended to introduce the student to a wide range of coastal environments. East/West Program. *Prereq.* Two years of college biology.

BIO 1472 Ocean and Coastal Processes 3 4 QH
Includes studies of the open ocean, rocky intertidal areas, sandy beaches, and estuarine environments of the New England coast. Demonstrates basic biological principles through comparative studies. The third of a series of three courses intended to introduce the student to a wide range of coastal environments. Offered at Marine Science Center in Nahant. *Prereq.* Two years of college biology.

BIO 1475 Biology and Ecology of Fish 4 QH
Examines the ecology, evolution, systematics, and behavior of fish. Uses field study, lectures, and labs. Studies specimens taken from New England waters. Lab fee. *Prereq.* Two years of college biology.

BIO 1477 The Biology of Corals 4 QH
Concentrates on tropical cnidaria in a field, lecture, and lab course. The course will study the systematics, anatomy, physiology, and ecology of this group of animals which assume such an important role in tropical marine ecosystems. East/West Program. *Prereq.* Two years of college biology.

BIO 1478 The Biology of Fishes 5 QH
Examines the systematics, anatomy, behavior and ecology of fish with emphasis on tropical forms. *Prereq.* Two years of college biology.

BIO 1479 Adaptations of Aquatic Organisms 4 QH
Explores aquatic organisms through a study of their evolutionary responses to the aquatic habitat. Considers the physical properties of water that have affected form, function, and behavior of all aquatic organisms. Uses density, viscosity, diffusion rates, pressure effects, and elementary fluid mechanics to explain such characteristics as the body shape of larvae, hearing and sound production, suspension feeding, and buoyancy. Course includes lectures, labs, demonstrations, and individual research projects. Offered at Marine Science Center in Nahant. *Prereq.* Two years of college biology.

BIO 1480 Senior Biochemistry Seminar 1 QH
Examines recent developments in various topics of biochemistry. Emphasizes student presentation and analysis. *Prereq.* BIO 1103 through BIO 1261 or BIO 1463.

BIO 1490 Senior Seminar 1 QH
Examines recent developments in various topics of zoology, microbiology, physiology, botany, ecology, genetics, and cell biology. Emphasizes student presentation and analysis. Limited to qualified juniors and seniors in the BA program and required of seniors in the BS program. *Prereq.* BIO 1103 through BIO 1261.

BIO 1491, BIO 1492 Directed Study 1, 2**2 QH each**

Offers independent work on a chosen topic under the direction of department faculty. Limited to qualified juniors and seniors with approval of the department and special arrangements with the supervising faculty member. The two quarters of this course together count as one biology department elective. *Prereq.* BIO 1103 through BIO 1261.

BIO 1495, BIO 1496, BIO 1497, BIO 1498**4 QH each****Junior/Senior Honors Project**

For details contact the honors office.

Chemistry

Introductory Chemistry Courses

CHM 1100 Chemistry for Managers in a High-Tech World**4 QH**

Examines fundamentals and applications of chemistry of particular interest to students in business. Discusses atomic theory, chemical bonding and reactions, states of matter and common chemicals, and foundations of organic chemistry. Makes applications to plastics and polymers, biochemistry, semiconductors, and nuclear power.

CHM 1104 Environmental Chemistry**4 QH**

Presents the principles of chemistry: molecular structure and reactivity, stoichiometry, equilibrium, and kinetics in the context of environmental issues including global warming, acid rain, aquatic chemistry, and ozone depletion.

CHM 1105 General Chemistry for the Health Sciences 1**5 QH**

Examines topics in inorganic chemistry relevant to students in the health sciences. Topics include atomic structure; energy changes in physical and chemical processes; stoichiometry; chemical bonding; gases, liquids, and solids; solutions; acids and bases; equilibrium, and kinetics. Topics are related to molecular processes in the human body.

CHM 1106 General Chemistry for the Health Sciences 2**5 QH**

Introduces organic chemistry and organic substances of biological significance. Covers structure and reactivity of alkanes, alkenes, alkynes, aromatic compounds, oxygen containing compounds (alcohols, aldehydes, ketones, esters, ethers, and carboxylic acids), sulfur containing compounds (thiols and sulfides), nitrogen containing compounds (amines and amides), carbohydrates, proteins, lipids, and nucleic acids. Biological chemistry includes the study of enzymes, vitamins, metabolic pathways, and body fluids. *Prereq.* CHM 1101.

CHM 1111 General Chemistry for the Life Sciences 1**5 QH**

Designed for nonchemistry majors. Focuses on basic concepts and definitions: the mole concept and chemical stoichiometry, states of matter, solutions, periodicity of elements, atomic structure, and chemical bonding and reactions. Lab fee. (II)

CHM 1122 General Chemistry for the Life Sciences 2B**5 QH**

For nonchemistry majors who will be taking CHM 1264. Covers chemical kinetics and equilibria, acids and bases, elementary thermodynamics and kinetics, and electrolysis and electrochemistry. Lab fee. *Prereq.* CHM 1111.

CHM 1130 Fundamentals of Chemistry**4 QH**

Focuses on applications and principles of chemistry. Examines elementary atomic theory, physical and chemical properties of matter, chemical reactions and stoichiometry, and chemical measurements with applications in engineering technology.

CHM 1131 General Chemistry for Engineering Students 1**4 QH**

Primarily for engineering students. Introduces the principles of chemistry, focusing upon the states and structure of matter and chemical stoichiometry.

CHM 1132 General Chemistry for Engineering Students 2**4 QH**

Primarily for engineering students. Introduces the principles of chemistry, focusing upon chemical equilibria, the nature of some common materials, and energy considerations in chemical and nuclear transformations. *Prereq.* CHM 1131.

CHM 1138 General Chemistry Laboratory**1 QH**

Required for students planning to major in chemical engineering. Optional for other students taking CHM 1132. Experiments pertaining to lecture material. Lab fee.

CHM 1151 General Chemistry for Science Majors 1**5 QH**

For chemistry majors and selected students in other majors, such as biology, physics, and so on. Focuses on basic concepts and definitions, moles, gas laws, stoichiometry, atomic structure, periodic properties, and chemical bonding. Lab fee.

CHM 1152 General Chemistry for Science Majors 2**5 QH**

Covers solutions, chemical kinetics, chemical equilibrium, chemical thermodynamics, electrochemistry, chemistry of the representative elements. Lab fee. *Prereq.* CHM 1111 or CHM 1151.

Advanced Chemistry Courses

CHM 1221 Analytical Chemistry**4 QH**

For nonchemistry majors. Covers the principles and practice of chemical methods of analysis with an introduction to spectrophotometry, ion selective electrodes, and gas chromatography. Discusses methods and applications for the fields of biology, clinical chemistry, toxicology, and environmental investigations. Lab fee. *Prereq.* CHM 1122 or equivalent.

CHM 1231 Analytical Chemistry for Majors**5 QH**

For chemistry majors. Covers the principles and practice of chemical methods of analysis with an introduction to spectrophotometry, ion selective electrodes, and gas chromatography. Examines method development, equilibrium limitations in analysis, and statistical evaluation of data as well as methods and applications for the fields of biochemistry, industrial chemistry, and chemical research. Lab fee. *Prereq.* CHM 1152 or equivalent.

CHM 1264 Organic Chemistry for Biology Science Majors 1**5 QH**

For nonchemistry majors. Covers nomenclature, preparation, properties, and reactions of common organic compounds. Lab fee. *Prereq.* CHM 1122, CHM 1152, or equivalent.

CHM 1265 Organic Chemistry for Biology Science Majors 2**5 QH**

Continues CHM 1264. Lab fee. *Prereq.* CHM 1264.

CHM 1268 Organic Chemistry for Pharmacy Majors 1**5 QH**

For pharmacy majors. Covers nomenclature, preparation, properties, and reactions of common organic compounds. Lab fee. *Prereq.* CHM 1122, CHM 1152, or equivalent.

- CHM 1269 Organic Chemistry for Pharmacy Majors 2** 5 QH
Continues CHM 1268. Lab fee. *Prereq.* CHM 1268.
- CHM 1271 Organic Chemistry for Chemistry Majors and Chemical Engineering Students 1** 3 QH
For chemistry majors, chemical engineering students, and selected students in other majors. Covers synthesis and properties of aliphatic and aromatic hydrocarbons and their functional derivatives, correlation between the structure of organic compounds and their physical and chemical properties, and electronic interpretation of organic reactions. *Prereq.* CHM 1153 or CHM 1132, and CHM 1138 or equivalent.
- CHM 1272 Organic Chemistry for Chemistry Majors and Chemical Engineering Students 2** 5 QH
Continues CHM 1271. Lab fee. *Prereq.* CHM 1271.
- CHM 1273 Organic Chemistry for Chemistry Majors and Chemical Engineering Students 3** 5 QH
Continues CHM 1272. Lab fee. *Prereq.* CHM 1272.
- CHM 1280 Physical Chemistry for the Life Sciences 1** 4 QH
Examines physiochemical principles as they apply to biological processes. Covers thermodynamics, kinetics, equilibria, oxidation-reduction reactions, transport processes, quantum mechanics, and spectroscopy. *Prereq.* CHM 1122, CHM 1152, or equivalent.
- CHM 1281 Physical Chemistry for the Life Sciences 2** 4 QH
Continues CHM 1280. *Prereq.* CHM 1280.
- CHM 1381 Physical Chemistry 1** 3 QH
Introduces chemical thermodynamics. Covers the three laws of thermodynamics and their applications to thermochemistry, material equilibrium, and reaction equilibrium. *Prereq.* CHM 1132, CHM 1152, or equiv.; MTH 1223, MTH 1243, or equivalent; PHY 1223, PHY 1233, or equivalent.
- CHM 1382 Physical Chemistry 2** 3 QH
Continues chemical thermodynamics, kinetics, and transport processes. Covers theoretical concepts and practical applications of phase equilibria, quantitative use of phase diagrams, kinetic molecular theory and applications to transport processes, reaction kinetics, and mechanism. *Prereq.* CHM 1381.
- CHM 1383 Physical Chemistry 3** 3 QH
Presents the fundamental principles of quantum mechanics and their application to chemical problems. Emphasizes applications to atomic and molecular spectroscopy. *Prereq.* CHM 1382.
- CHM 1394 Experimental Physical Chemistry 1** 2 QH
Presents experiments that demonstrate simple yet accurate ways of measuring fundamental physical chemical phenomena. Examines treating experimental methodology and error analysis. Introduces computer-based data analysis. Emphasizes the preparation of concise and literate laboratory reports. Lab fee. *Prereq.* CHM 1381 or taken concurrently.
- CHM 1395 Experimental Physical Chemistry 2** 2 QH
Examines experiments based on various physical chemistry topics presented in CHM 1382. Explains and demonstrates computer interfacing of experimental apparatus. Focuses on data analysis using computer-based spread sheet and analysis programs. Emphasizes preparing concise and literate laboratory reports. Lab fee. *Prereq.* CHM 1382 or taken concurrently.
- CHM 1396 Experimental Physical Chemistry 3** 2 QH
Focuses on experiments in atomic and molecular spectroscopy and molecular photophysics that illustrate the principles discussed in CHM 1383. Emphasizes experimental methodology and preparing reports. Lab fee. *Prereq.* CHM 1383 or taken concurrently.
- CHM 1422 Instrumental Methods of Analysis** 4 QH
For chemistry majors and selected students in other majors. Covers principles, methods, and applications of electroanalytical chemistry, optical spectroscopy, and chromatography. Includes selected topics in instrumental design and function and in non-optical spectroscopy. *Prereq.* CHM 1382 and CHM 1231, or permission of instructor. Chemistry majors take CHM 1432 concurrently.
- CHM 1432 Instrumental Analysis Laboratory** 2 QH
For chemistry majors and selected students in other majors registered for CHM 1422. Focuses on lab experiments related to topics covered in CHM 1422. Lab fee.
- CHM 1441 Inorganic Chemistry** 4 QH
Studies atomic properties of free atoms and ions; ionic bonding and the structure of the solid state; the Madelung calculation; the Born-Haber and other thermodynamic cycles; valence-bond, molecular, orbital, and crystal field theories of bonding; stereochemistry of compounds of representative elements; electron-deficient compounds; and spectral and magnetic properties of transition metal compounds. *Prereq.* CHM 1383.
- CHM 1451 Experimental Inorganic Chemistry** 2 QH
Presents topics in modern inorganic and organometallic chemistry. Introduces important experimental techniques. Lab fee. *Prereq.* CHM 1441 or taken concurrently.
- CHM 1461 Identification of Organic Compounds** 3 QH
Examines qualitative analysis of organic compounds and mixtures, using physical, chemical, and instrumental methods. Lab fee. *Prereq.* CHM 1265 or CHM 1273.
- CHM 1491, CHM 1492 Directed Study** 2 QH each
Offers independent work under the direction of a faculty member. *Prereq.* An organic chemistry sequence, and analytical chemistry and departmental approval.
- CHM 1521 Advanced Analytical Chemistry 1** 3 QH
Examines analytical separations. Corresponds to CHM 3521. *Prereq.* CHM 1422 or equivalent.
- CHM 1523 Advanced Analytical Chemistry 2** 3 QH
Examines the theory, practice, instrumentation, and application of selected electroanalytical methods of analysis. Corresponds to graduate course CHM 3523. *Prereq.* CHM 1422 or equivalent.
- CHM 1525 Advanced Analytical Chemistry 3** 3 QH
Covers optical methods of analysis. Corresponds to CHM 3525. *Prereq.* CHM 1422 or equivalent.
- CHM 1561 Advanced Organic Chemistry 1** 3 QH
Focuses on organic structure and reactions. Corresponds to graduate course CHM 3561. *Prereq.* CHM 1273 or CHM 1265.
- CHM 1562 Advanced Organic Chemistry 2** 3 QH
Examines organic structure and reactions. Corresponds to graduate course CHM 3562. *Prereq.* CHM 1561.

- CHM 1563 Advanced Organic Chemistry 3** 3 QH
Focuses on organic structure and properties. Corresponds to graduate course CHM 3563. *Prereq.* CHM 1562.
- CHM 1564 Spectrophotometric Identification of Organic Compounds** 3 QH
Examines spectrophotometric identification of organic compounds. Corresponds to graduate course CHM 3564. *Prereq.* CHM 1273 or equivalent.
- CHM 1581 Advanced Physical Chemistry 1** 3 QH
Examines chemical thermodynamics. Corresponds to graduate course CHM 3581. *Prereq.* CHM 1383.
- CHM 1591 Advanced Physical Chemistry 2** 3 QH
Focuses on atomic and molecular structure. Corresponds to graduate course CHM 3591. *Prereq.* CHM 1383.
- CHM 1738 General Chemistry Laboratory (Honors)** 1 QH
Honors equivalent of CHM 1138.
- CHM 1741 General Chemistry 1 (Honors)** 4 QH
Honors equivalent of CHM 1131.
- CHM 1742 General Chemistry 2 (Honors)** 4 QH
Honors equivalent of CHM 1132.
- CHM 1751 General Chemistry 1 (Honors)** 5 QH
Honors equivalent of CHM 1101.
- CHM 1752 General Chemistry 2 (Honors)** 5 QH
Honors equivalent of CHM 1152.
- CHM 1800, CHM 1801, CHM 1802, CHM 1803, CHM 1804, CHM 1805 Undergraduate Research** 4 QH each
Students may conduct original experimental work under the direction of a faculty member. A minimum of a two-quarter commitment and approval of the executive officer of the chemistry department are required. *Prereq.* *Middler standing or above, chemistry major status, and a minimum QPA of 2.8 in courses required for the major.*
- CHM 1811 Advanced Chemical Laboratory Practice 1** 4 QH
Staff members direct lab projects in analytical, inorganic, organic, and physical chemistry. Lab fee. *Prereq.* CHM 1273, CHM 1395, CHM 1396, CHM 1422, and departmental approval.
- CHM 1812 Advanced Chemical Laboratory Practice 2** 4 QH
Students may continue lab projects from CHM 1811 or carry out new projects in different areas. Lab fee. *Prereq.* CHM 1811 and departmental approval.
- CHM 1840, CHM 1841, CHM 1842, CHM 1843** 4 QH each
Junior/Senior Honors Project
For details contact the honors office.
- CMN 1111 Oral Interpretation of Literature** 4 QH
Teaches the theory and skill of dramatic reading, with an emphasis on analyzing and presenting literature orally. Analyzes prose, poetry, and dramatic selections to communicate the author's meaning through voice, tone, and gesture.
- CMN 1115 Foundations of Communications** 4 QH
Explores the history and nature of human interaction through speech. Includes such topics as the communication process; verbal and nonverbal; interpersonal, group, and public communication contexts; communication ethics; and the mass communication media. Offers the opportunity to learn principles governing effective communication.
- CMN 1116 Public Speaking** 4 QH
Develops skills in public communication. Includes topics such as choosing and researching a topic, organizing and delivering a speech, handling speech anxiety, listening critically, and adapting language to an audience. Offers the opportunity for students to present a series of speeches and receive advice and criticism from an audience.
- CMN 1210 Advanced Voice and Articulation** 4 QH
Develops the vocal techniques introduced in CMN 1110. Includes work with speech patterns and dialects. Develops the professional speaking voice through exercises and applying concepts. *Prereq.* CMN 1110.
- CMN 1211 Advanced Oral Interpretation** 4 QH
Provides an in-depth study of analyzing and performing literature. Includes topics such as classical literature, group performance of literature, and programming. *Prereq.* CMN 1111.
- CMN 1232 Communication and Gender** 4 QH
Reviews contemporary research in gender, specifically the role that gender plays in human communication. Includes topics such as "genderlect," gender bias in language, and gender images communicated in the media.
- CMN 1239 Argumentation and Debate** 4 QH
Introduces the principles and skills of effective argument. Includes topics such as the process of advocacy, developing an argument through reasoning, the psychology of argument, and motivational techniques of argumentation. Combines theory and practice in argument through individual presentations and team debates. *Prereq.* CMN 1116 or permission of instructor.
- CMN 1240 Advanced Studies in Speech Performance** 4 QH
Provides an opportunity to expand skills and strategies in public speaking and debate. Designed for students in the forensic program and for students wishing more in-depth study of public speaking and debate. Emphasizes development of competitively successful approaches to public speaking. *Prereq.* CMN 1116 or CMN 1239 or permission of instructor.
- CMN 1250 Introduction to Mass Communication** 4 QH
Surveys the various media of communication. Includes radio, television, film, newspapers, magazines, and electronic communication. Explores the impact media have on society.
- CMN 1300 Communication Theory** 4 QH
Surveys significant theories of human communication. Emphasizes such topics as systems theory, symbolic interaction theory, structuralist theories, and critical-cultural studies.

Communication Studies

- CMN 1110 Voice and Articulation** 4 QH
Provides training in developing clear and articulate speech. Includes topics such as the physiology of the vocal mechanism, voice projection and variety, articulation and pronunciation, and appropriate speech. Trains students through lectures, drills, and exercises.

CMN 1310 The Classical Age of Speech and Rhetoric**4 QH**

Surveys theories of persuasive speech in ancient Greece and Rome. Includes Aristotle's rhetoric, Sophistic traditions, the rhetoric of Cicero and Quintilian, and famous speeches of the Golden Age of Athens. Teaches the roots of the discipline of speech and communication.

CMN 1315 Theories of Persuasion**4 QH**

Examines the behavioral theories used to create or modify beliefs, attitudes, and values. Studies how professional persuaders conceive of and execute arguments for specific audiences.

CMN 1317 The Audience in Mass Communication**4 QH**

Explores how mass media audiences interpret and actively use media messages and products as listeners, readers, and consumers. Examines the different stages of ethnographic research, audience meanings and interpretations, pleasure and fandom, the role of media in everyday life, and the use of ethnographic research methods in communications studies. *Prereq.* CMN 1250.

CMN 1318 Negotiation Skills**4 QH**

Focuses on the process of negotiating mutually acceptable agreements in adversarial settings. Emphasizes collective bargaining as a form of problem solving, and resolving conflict through mediation. *Prereq.* *Middler standing or above or permission of instructor.*

CMN 1330 Interpersonal Communication**4 QH**

Helps students improve their interpersonal communications skills. Includes topics such as the self in communication, self-disclosure, language, nonverbal communication, listening skills, conflict resolution, and maintaining functional relationships through communication.

CMN 1331 Advanced Interpersonal Communication**4 QH**

Continues instruction in interpersonal communication. Focuses on applying principles of effective communication to human relationships. *Prereq.* CMN 1330.

CMN 1338 Group Discussion**4 QH**

Develops skills in working with and in small groups. Instructs in the small group decision-making process as well as in the interpersonal dynamics of the group. Includes topics such as problem solving, conflict resolution, role playing, and leadership.

CMN 1410 Contemporary Public Address**4 QH**

Analyzes significant public speeches from the recent past. Gives an opportunity to appreciate the role of oratory in major political and social movements by studying audio and videotapes of historic and influential speakers. Uses various critical theories to develop skills in criticism.

CMN 1415 Persuasion in Contemporary Culture**4 QH**

Develops students' critical thinking skills as receivers of persuasive communication. Examines instances of persuasion in popular culture such as advertising, mass media, and politics. Helps students become more informed, critical receivers of mediated messages. *Prereq.* CMN 1315 or permission of instructor.

CMN 1430 Organizational Communication**4 QH**

Surveys the communication process in complex organizations. Includes topics such as the evolution of organizational communication, communication networks, information management, and communication climate. Analyzes case studies and teaches how to improve the quality of communication in an organization. *Prereq.* CMN 1330 or permission of instructor.

CMN 1431 Advanced Organizational Communication**4 QH**

Examines the problems of sending and receiving information in complex organizations. Reviews technologies used to disseminate information, communication auditing processes, and methods to devise and assess communication programs for organizations.

Prereq. CMN 1430.

CMN 1437 Consultation Skills**4 QH**

Surveys techniques used to analyze communication problems in industry, organizations, and groups. Includes theory and practice using the case study methods. Offers students the opportunity to learn how to audit an organization, identify problems in communication, and suggest solutions. *Prereq.* CMN 1115, CMN 1300, CMN 1330, and CMN 1338.

CMN 1450 Television Studio Production**4 QH**

Introduces studio production techniques. Covers the creative and technical elements of video production, camera operation, floor direction, editing graphics, lighting, picture composition, and directing methods. *Prereq.* CMN 1250 or permission of instructor.

CMN 1451 Foundations of Broadcast Technology**4 QH**

Surveys the history of radio and television broadcasting technology in the United States and around the world. Includes the evolution of technology, broadcast television versus cable and pay-per-view, effects of technology on the media, and the future of broadcast technology. Develops an understanding and appreciation of broadcast technology's impact on contemporary society.

CMN 1452 Radio Production**4 QH**

Introduces the principles and practices of radio. Includes lab work in studio production and instruction in program design, ratings, and on-air performance. Gives students an opportunity to produce broadcast material such as feature stories, commercials, and public service announcements. *Prereq.* CMN 1250 or permission of instructor.

CMN 1453 Broadcast Management**4 QH**

Examines the four critical functions of media management: economics, marketing, advertising, and ratings. Includes FCC regulatory policies, external market forces, and internal management forces. *Prereq.* CMN 1250 and middler standing or above.

CMN 1454 Programming for Radio and Television**4 QH**

Examines the history of radio and television programming and the structure in which programming operates. Covers network, network affiliate, independent, cable, and public television and radio, and the major suppliers of programs such as Hollywood studios, independent producers, syndicates, networks, and local stations. Reviews how the practical components of the program marketplace, such as rating, scheduling, regulation, and advertising, developed historically. Includes an opportunity to design a music wheel for radio and a short video segment for television.

CMN 1455 Television Field Production**4 QH**

Offers advanced training in video production techniques, emphasizing remote location shooting. Includes location scouting, production budgets, writing techniques, equipment location, post-production editing, and content analysis. Offers the opportunity to work in teams to produce and direct television using remote video equipment. *Prereq.* CMN 1250 and CMN 1450.

CMN 1500 Special Topics in Communication Studies**4 QH**

Examines various contemporary issues in communication studies. Course content to be posted in communication studies

department prior to quarter in which it is offered. *Please consult prior to registering.*

CMN 1554 Special Topics in Media 4 QH
Examines various contemporary issues in mass media.

CMN 1555 Communication and the Quality of Life 4 QH
Exposes students to the role that communication plays in the quality of individual and community life. Helps students explore the impact of contemporary communication trends. Analyzes the impact of various media on quality of life. *Prereq. Middler standing, CMN 1330, or permission of instructor.*

CMN 1600 Introduction to Communication Research 4 QH
Introduces the various methods through which scholars of communication develop knowledge. Includes historical, descriptive, experimental, and ethnographic methods. Expects student to engage in individual research projects designed to increase familiarity with communication literature and to develop skills in critical writing and library research. *Prereq. CMN 1300 or permission of instructor.*

CMN 1610 Rhetorical Criticism 4 QH
Offers a critical analysis of a range of rhetorical texts: visual, literary, oral, and musical. Includes traditional and cultural approaches to criticism. (V)

CMN 1620 Television Criticism 4 QH
Offers an advanced communication course where students analyze and evaluate representations of race, class, gender, and the family in television discourse. Aims to increase awareness of the ways that the aural, visual, and aesthetic codes of television work to shape beliefs and values. *Prereq. CMN 1610.*

CMN 1800, CMN 1801, CMN 1802, CMN 1803 4 QH each
Junior/Senior Honors Project
For details contact the honors office.

CMN 1890, CMN 1891, CMN 1892 Directed Study 4 QH each
Prereq. Permission of instructor.

CMN 1893 Directed Study 1 QH
Prereq. Permission of instructor.

CMN 1894 Directed Study 2 QH
Prereq. Permission of instructor.

CMN 1895 Internship in Speech Communication 4 QH
Gives students the opportunity to gain hands-on experience in the communications industry. Requires prior approval by the internship director prior to registration. Further internship details are available in the department office.

such as unemployment, inflation, poverty, crime, the environment, medical care, and international competitiveness. *Limited to students who have not taken ECN 1115 or ECN 1116. Cannot be used to meet any departmental requirement of the major.*

ECN 1115 Principles of Macroeconomics 4 QH
Introduces macroeconomic analysis. Topics include the flow of national income, economic growth and fluctuation, the role of money and banking, and monetary and fiscal policies. Emphasizes the development of conceptual tools to analyze the economic problems facing modern society. (II)

ECN 1116 Principles of Microeconomics 4 QH
Focuses on development of basic theory of demand, supply, and market price. Explores applications to selected microeconomic problems, such as basic monopoly and competition, and other issues that relate to the role of the pricing system in resource allocation and income distribution. (II)

ECN 1130 Medical Economics 4 QH
Examines health-care trends in the United States and selected foreign countries, causes of the rising costs of medical care, the particular nature of the demand for health-care services, the demand for physicians and paramedical personnel, Certificate of Need committees, health maintenance organizations, medical malpractice, increases in life expectancy and its impact on society, third-party payers, and the true cost of medical education.

ECN 1140 Economics of Crime 4 QH
Covers economic analysis of crime and the criminal justice system. Topics include theoretical and empirical analysis of the economic causes of criminal behavior, the social costs of crime and its prevention, and design of enforcement policies.

ECN 1150 Economics of World Energy and Primary Resources 4 QH
Investigates economic, political, and historical backgrounds of energy and other resources problems. Analyzes future impact of primary resources limitations on United States and world economics as well as feasibility studies of resource substitution. *Prereq. ECN 1115 and ECN 1116.*

ECN 1170 Economic Issues In Minority Communities 4 QH
Examines the economic conditions of nonwhite minorities within the United States economy. Includes historical and cultural materials as well as specific theoretical and empirical analysis of the economic problems confronting minority communities. Same as AFR 1161. (VI)

ECN 1215 Macroeconomic Theory 4 QH
Investigates the conceptual and empirical problems of creating and using national accounts, price index problems, conceptual and empirical evaluation of consumption and investment functions and their policy implications, multiplier and accelerator models, and recent cyclical fluctuations. Analyzes theories of inflation, unemployment, and growth in the light of recent economic history. *Prereq. ECN 1115, and MTH 1114 or equivalent.*

ECN 1216 Microeconomic Theory 4 QH
Examines supply-and-demand analysis, various elasticity concepts and applications, theories of demand and production, and derivation of cost curves. Analyzes pricing and output behavior in the several market structures with their welfare implications and the pricing of resources. *Prereq. ECN 1116, and MTH 1114 or equivalent.*

Economics

Unless otherwise stated, there are no prerequisites for advanced economics courses. Where prerequisites are indicated, exceptions may be granted with the instructor's permission.

ECN 1001 Economic Problems and Perspectives 4 QH
Studies the economic concepts and methods that are useful to an informed citizen for an understanding of modern social issues

- ECN 1250 Statistics I** 4 QH
Discusses elementary set theory, basic probability, measurement and presentation of economic statistics, descriptive statistics, basic estimation techniques, testing statistical hypotheses, and sampling problems. *Economics majors who have earned credit for ECN 1250 may not receive credit for MSC 1200 or MTH 1152.*
- ECN 1251 Statistics 2** 4 QH
Studies analysis of variance, correlation and linear regression analysis, multivariate regression analysis, and Bayesian decision making. *Prereq. ECN 1250. Economics majors who have earned credit for ECN 1251 may not receive credit for MSC 1201.*
- ECN 1310 Labor Economics** 4 QH
Focuses on economic analysis of the labor market and the labor force. Topics include the supply, development and efficient use of human resources; wage determination; the changing occupational and industrial structure; causes, nature and incidence of unemployment; the economic impact of unions, related labor market institutions and relevant public policies. *Prereq. ECN 1116 or ECN 1115.*
- ECN 1311 Employment and Training Programs and Policies** 4 QH
Examines the nature and objectives of employment and training programs, the nature and causes of human resource problems, current and previous efforts to solve human resource problems in the United States, planning of human resource programs, and economic evaluation of employment and training programs. *Prereq. ECN 1115.*
- ECN 1312 Women in the Labor Market** 4 QH
Focuses on economic analysis of the labor market position of women in the context of the changing economic structure and labor market institutions. Analyzes female labor force participation differences; male/female differentials in earnings and unemployment; occupational concentration, occupational segregation, theories and evidence of sex discrimination; and new opportunities for women. *Prereq. ECN 1115 and ECN 1116.*
- ECN 1314 Economics of Education and Human Capital** 4 QH
Explores theoretical and empirical treatment of economic issues related to education and job training, including formal education (preschool through post-secondary), vocational education, on-the-job training, and government-sponsored employment and training programs. Emphasizes follow-up studies, cost-effectiveness analysis, and benefit-cost analysis for determining the effectiveness of education and training investments from a private and social standpoint. *Prereq. ECN 1116.*
- ECN 1315 Income Inequalities and Discrimination** 4 QH
Focuses on economic analysis of income inequalities, poverty, and discrimination. Examines the causes of income inequality and the nature, causes and effects of poverty; economics of racial discrimination; and public welfare system and other income maintenance schemes. *Prereq. ECN 1115 or ECN 1116.*
- ECN 1320 Urban Economics** 4 QH
Studies urban growth and development, intermetropolitan location of business firms, regional shifts in economic activity, intrametropolitan location of firms and households, and land use patterns. *Prereq. ECN 1116.*
- ECN 1321 Urban Economic Problems and Policies** 4 QH
Continues ECN 1320 but may be taken separately. Focuses on economic analysis of selected urban problems such as housing, poverty, transportation, education, health, crime, and the urban environment. Discusses public policies relating to such problems. *Prereq. ECN 1116.*
- ECN 1322 Economics of Transportation** 4 QH
Covers transportation and land-use patterns; externalities; social costs and social benefits of various modes of transportation, ownership, regulations, and financing of various modes of transportation; and economics of new technology in transportation. *Prereq. ECN 1116.*
- ECN 1323 Environmental Economics** 4 QH
Applies the tools of economics to environmental issues. Explores taxonomy of environmental effects; externalities; the commons problem; taxation, regulations, marketable permits, and property rights as a solution; measuring benefits of cleaner air and water, noise abatement, and recreational areas; global issues including tropical deforestation and acid rain; the relevance of economics to the environmental debate. *Prereq. ECN 1116.*
- ECN 1330 Development Economics** 4 QH
Explores prospects for economic growth and development in poor nations as indicated by economic analysis and historical experience; social, cultural, and institutional determinants of growth; analysis of agriculture and development, the role of technological change, population; and foreign trade. (V)
- ECN 1331 American Economic Development** 4 QH
Studies economic development of the United States from the colonial period to the present, historical changes in economic institutions and technologies, with special attention to preconditions of industrialism; the American Industrial Revolution, its spread and socioeconomic consequences; the Great Depression and the subsequent rise of mixed economy and welfare state; and United States adjustments to postwar economic changes.
- ECN 1332 Economic History of Less Developed Countries** 4 QH
Considers the problems of initiating and sustaining economic development in selected Third World countries during the last two hundred years. Country-specific case studies cover the role of traditional economic structures, different development goals and strategies, state policies, and international economic relations. *Prereq. ECN 1115 and ECN 1116; ECN 1330 recommended.*
- ECN 1333 European Economic Development** 4 QH
Discusses economic inheritance of the nineteenth century development of capitalism and laissez-faire; the aftermath of the Industrial Revolution, European overseas expansion, the world wars, and the dissolution of empires; American economic conquest and European integration; the future of less developed areas in southern Europe; environmental impact of industrialism and the implications of technological society. (III)
- ECN 1334 Comparative Economics** 4 QH
Emphasizes competing types of theoretical economic systems; analysis of organization and operation of currently existing types of communist, socialist, and capitalist economies; comparison and evaluation of economic behavior and performance of different economic systems. *Prereq. ECN 1115 and ECN 1116.*
- ECN 1335 International Economics: Finance** 4 QH
Introduces the workings of foreign exchange markets, balance of payments, fiscal and monetary policy in an open economy under different exchange rate regimes, international capital movements,

and the international monetary system. *Prereq.* ECN 1115 or permission of instructor.

ECN 1336 International Economics: Trade 4 QH

Examines trade theories and patterns, impact of trade on domestic factor prices, factor movements, and terms of trade. Explores welfare implications and political economy of alternative trade policies, such as free trade, tariffs, quotas, and custom unions. *Prereq.* ECN 1116 or permission of instructor.

ECN 1337 History of Economic Thought 4 QH

Traces the evolution of Western economic thought. Covers several important schools in economics, examining the questions economists raise and analytical methods they use to study human behavior. *Prereq.* ECN 1115 and ECN 1116.

ECN 1340 Government Expenditures: Structure and Evaluation 4 QH

Covers fiscal functions of government, fiscal institutions and politics, theory of social goods, public expenditure growth and structure, federal budget expenditure evaluation and cost-benefit case studies, fiscal federalism in theory and practice, and issues of public debt and deficit. *Prereq.* ECN 1116 or equivalent.

ECN 1341 Financing of Government: Taxation and Debt 4 QH

Considers principles of taxation; problems of tax structure and reform at federal, state, and local levels; tax incidence; effects of taxation on economic efficiency and growth; negative income tax and social security finance; issues of public debt and deficit. *Prereq.* ECN 1116 or equivalent.

ECN 1342 Money and Banking 4 QH

Studies the nature and the functions of money, credit, and the role of financial organizations in the United States economy. Emphasizes theories of banking, money supply, and monetary policy. *Prereq.* ECN 1115 or equivalent.

ECN 1345 Business Cycles and Inflation 4 QH

Considers the theories of business cycles and inflation and an empirical application of these theories to current business cycle, inflation, and stagflation problems. *Prereq.* ECN 1115, ECN 1116, and ECN 1215.

ECN 1350 Introduction to Econometrics 4 QH

Presents an introduction to the methods of econometric analysis and forecasting. Covers ordinary least squares, piecewise regression, tests and corrections for serial correlation and heteroskedasticity, specification analysis, simultaneous equations systems, errors in variables, dynamic models and elementary forecasting. *Prereq.* ECN 1115, ECN 1116, and ECN 1251.

ECN 1351 Problems in Economic Research 4 QH

Examines research methods used by practicing economists. Discusses typical problems from applied areas of economics, including choice of modeling framework, problems of data collection, review of estimation techniques, interpretation of results, and development of static and dynamic adaptive policy models. *Prereq.* ECN 1115, ECN 1116, and ECN 1251.

ECN 1353 Introduction to Mathematics for Economists 4 QH

Introduces basic tools of mathematics, matrix algebra, differential and integral calculus and classical optimization, with special reference to economic applications. *Prereq.* ECN 1115 and ECN 1116.

ECN 1360 Managerial Economics 4 QH

Explores the application of economic principles and theory, by the use of case studies, to the solution of decision-making problems in such areas as demand forecasting, price policies, estimation and control of costs, financing of capital investments, and responses to government taxation and regulation policies. *Prereq.* ECN 1116.

ECN 1361 Social Control of Economic Activities 4 QH

Focuses on the development of the government's role in economic activities, examining the relationships between the government and industry, labor, agriculture, public utilities, and consumers. Traces the changing role of the government from a laissez-faire policy to one of direct intervention in the economy. Covers such topics as wage and price control, environment and antipollution policies, consumer protection, and conglomerate mergers.

ECN 1362 Industrial Organization and Public Policy 4 QH

Presents an analytic framework and empirical study of how the structure of industrial organization and conduct of sellers and buyers affects economic performance and welfare. Includes industrial examples and case studies. Examines antitrust as a public policy designed to promote better market performances. *Prereq.* ECN 1116.

ECN 1401 Advanced Economic Theory 4 QH

Covers advanced theoretical treatment of selected topics in micro- and macroeconomics. Recommended for students planning to take graduate economics. *Prereq.* ECN 1215 and ECN 1216.

ECN 1415 Selected Topics in Macroeconomics 4 QH

Studies macroeconomic issues. *Prereq.* Permission of instructor.

ECN 1416 Selected Topics in Microeconomics 4 QH

Studies microeconomic issues. *Prereq.* Permission of instructor.

ECN 1481 Directed Study 1 QH

Offers independent work on a chosen topic under the direction of a faculty member of the department. Should not be substituted for the course requirements leading to a BA or BS degree in economics. Up to four quarter hours per offering, with an eight quarter-hour maximum. *Prereq.* Qualified senior economics majors and approval of department chair.

ECN 1482 Directed Study 2 QH

Offers independent work on a chosen topic under the direction of a faculty member of the department. Should not be substituted for the course requirements leading to a BA or BS degree in economics. Up to four quarter hours per offering, with an eight quarter-hour maximum. *Prereq.* Qualified senior economics majors and approval of department chair.

ECN 1483 Directed Study 3 QH

Offers independent work on a chosen topic under the direction of a faculty member of the department. Should not be substituted for the course requirements leading to a BA or BS degree in economics. Up to four quarter hours per offering, with an eight quarter-hour maximum. *Prereq.* Qualified senior economics majors and approval of department chair.

ECN 1484 Directed Study 4 QH

Offers independent work on a chosen topic under the direction of a faculty member of the department. Should not be substituted for the course requirements leading to a BA or BS degree in economics. Up to four quarter hours per offering, with an eight

quarter-hour maximum. *Prereq.* Qualified senior economics majors and approval of department chair.

ECN 1492 Senior Economics Seminar 4 QH
Coordinates and applies economic concepts, methodology, and data to issues and problems of broad social, economic, and philosophical importance. *Prereq.* ECN 1216 and ECN 1215; senior economics majors only.

ECN 1495, ECN 1496, ECN 1497, ECN 1498 4 QH each
Junior/Senior Honors Project
For details contact the honors office.

ECN 1715 Macroeconomics Principles (Honors) 4 QH
Honors equivalent of ECN 1115.

ECN 1716 Microeconomics Principles (Honors) 4 QH
Honors equivalent of ECN 1116.

Education

ED 1003 Reading/Study Skills 1 4 QH
Provides instruction to students who demonstrate a need to be more efficient in comprehending and studying college textbooks and collateral reading assignments. Concentrates on techniques involved in understanding informative materials and introduces the evaluation of persuasive prose. In addition, presents suggestions on such topics as how to listen to and take summary notes on course lectures and how to set study goals and priorities consistent with course objectives.

ED 1004 Reading/Study Skills 2 4 QH
Continues topics introduced in ED 1003 and expands upon the analysis and interpretation of persuasive texts. Emphasizes reading imaginative prose for meaning and pleasure, preparing for and taking examinations, and learning to adjust reading speed and method to various materials encountered in concurrent courses.

ED 1005 Practicum in Reading and Study Skills 4 QH
Gives students in the academic program Project Ujima comprehensive tools to help them to master the how-to's of reading textbooks, notetaking, outlining, introductory research skills, time management, studying skills, and other techniques necessary for success in college.

ED 1100 Human Services and Social Science 4 QH
Draws on anthropology, psychology, and sociology, and some of the concepts, methods, and terminology of those fields. Concentrates on the evolution of human nature, the influence of previous experience and learning on the behavior of individuals and groups, the difficulties in achieving a full degree of humanity in a technological society, and the potentially powerful roles that "professional socializers" (teachers, clinicians, group leaders, and so forth) can play in the lives of students and clients.

ED 1101 Education for the Future 4 QH
Discusses human survival and continued development as problems of educating people to use their skills and abilities to live harmoniously. Examines the teaching and learning process used to transmit information and values from one generation to the next, and places these processes in the context of the past, present, and future of the American family and education. Approaches these issues with a creative and humanistic perspective.

ED 1102 Child Development, Learning and Education 4 QH
Surveys developmental processes from the prenatal period through preadolescence. Covers principles of physical, cognitive, language, social, and personality development and discusses the implications for childrearing and schooling.

ED 1103 Adolescent Development, Learning and Education 4 QH
Presents a basic overview of the continuity of human development in contemporary society, from the pre-adolescent period through adolescence, adulthood, middle age, and old age. Considers significant areas of growth, development, and adjustment for each period, including social, sexual, personality, motivational, and cognitive aspects.

ED 1104 Analysis of the Instructional Process 4 QH
Examines conflicting theories about the nature of teaching and learning. Evaluates the effects of traditional and innovative educational systems on learners. Identifies educational tools for describing, analyzing, and evaluating aspects of learning and teaching; refines students' use of those tools during sequential field observations and class meetings. Requires fieldwork.

ED 1105 Day Care and Nursery Schools: Social and Cultural Origins 4 QH
Explores the origins of the increased contemporary use of out-of-the-family child care arrangements in the United States and in selected European and third-world nations. Covers the interrelation of industrialization, technology, and family functioning; contrasting varieties of child care centers in operation today; and effects of the proliferation of child care centers on other aspects of society, such as neighborhood life, business, parents' life-styles, elementary school curricula, government spending, and the job market in education and human services. Requires three to four hours per week of fieldwork in child care. *Prereq.* ED 1100 or equivalent.

ED 1106 Creative Expression in Children 4 QH
Assists students who are interested in working with children in a variety of settings. Focuses on the potential of creative expression in interpersonal communication and the relation of children's creative experiences to their cognitive, emotional, and social development. Provides the opportunity to acquire the hands-on experience and confidence to work with various media available for creative expression. *Prereq.* ED 1102.

ED 1107 Beginning Computer Use in Education 4 QH
Introduces students who are unfamiliar with software applications to computer use through general purpose software: word processing and data processing. Covers operating systems commands as well as concepts relating to computer hardware and software. Suggests methods of applying the computer to study requirements in college and to teaching.

ED 1300 Education and Psychosocial Development 4 QH
Examines theories and research on the socialization functions of education. Covers the relative influence of early versus post-childhood socialization and the role of diverse educational experiences and institutions in personality development. *Prereq.* ED 1100 or equivalent.

ED 1302/HS 1302 The Human Services Professions 4 QH
Explores what a human service agency is, how it comes into being, how it grows and changes. Analyzes attitudes, values, skills, and knowledge of the human services worker and the reasons why people in modern society require human services assistance. Views human services from the eyes of clients as well as society as a

whole. Requires fieldwork in a human service agency as well as a good deal of independent study. Required for all human services majors; open to other students on space-available basis. *Prereq.* ED 1100, SOC 1100, or equivalent.

ED 1306 Measurement and Evaluation 4 QH

Emphasizes evaluation techniques for use in the classroom and teaching-learning situations at all levels. Explores the importance of establishing behavioral objectives as a basis for evaluation. Places considerable emphasis on improving teacher-made tests, especially objective-type tests. Requires students to construct an objective test in their discipline for an instructional unit. Also reviews other evaluation techniques besides tests. Gives brief attention to standardized measurement instruments of ability and achievement as they may be used in the evaluation of pupil progress. *Prereq.* ED 1104.

ED 1309/HS 1309 Intervention Strategies for the Human Services 4 QH

Introduces the range of skills used in working with clients in the various helping professions such as counseling (individual and group), advocacy, rehabilitation, community organizing, and income maintenance. Utilizes role playing, simulations, and interviews with practicing professionals. Requires reading but not fieldwork. Intended as preparation for more specialized courses; required for human services majors but open to other students with appropriate backgrounds.

ED 1311 Case Management: Diagnosis and Treatment 4 QH

Introduces the basic theory and skills of managing clients' treatment programs in a variety of institutional settings. Provides training in identifying the components of a psychosocial assessment. Examines common techniques of planned service delivery and resource coordination and reviews the entitlements available to clients of diverse needs and backgrounds. *Prereq.* PSY 1111 or SOC 1100.

ED 1318 Seminar in Early Childhood Development 4 QH

Focuses on views of cognitive, personality, and social development during early childhood. Discusses the implications of these views. Requires each student to carry out a project in the field placement and report results to the seminar. *Prereq.* ED 1102.

ED 1319 Speech, Language, and Cognition in the Young Child 4 QH

Provides an overview of normal speech and language development and its relationship to cognition in the young child. Describes speech-language and cognitive behaviors in a variety of disordered populations and outlines a team approach to treating such disorders. Uses a variety of case studies to describe the assessment and remediation of young children with speech and language disorders in the classroom. Team taught by faculty from the Department of Education and from the Department of Speech-Language Pathology and Audiology. Provides students an opportunity to understand the implications of disordered speech and language for classroom learning. *Prereq.* ED 1102.

ED 1405 Literature and Learning Materials for Children and Young Adults 4 QH

Offers a comprehensive survey of the field of children's literature and literature for young adults. Although designed specifically for prospective teachers (and required of all Early Childhood and Elementary Education majors), may also be taken as an elective by all students. Surveys and evaluates examples of contemporary children's literature and other learning materials used in preschool, elementary, secondary, and remedial programs. Covers such recurring themes as racism and sexism in children's

books, controversial books for young children, contemporary illustrators, and banned books.

ED 1406 Elementary Education Curriculum 1 4 QH

Examines rationales for major curriculum movements in elementary education, emphasizing what current research predicts as reasonable directions to follow. Engages students in different but complementary experiences to demonstrate that an array of teaching strategies enables children to learn in ways compatible for them. Gives particular attention to using sensory approaches via visual art, music, and movement as a basis for integrated program design in all subject areas. Stresses the nature of the thinking processes underlying the activities, and ways to sensitize children to these processes. Team taught by specialists in the arts and a specialist in curriculum. *Prereq.* ED 1104.

ED 1407 Elementary Education Curriculum 2 4 QH

Describes and evaluates social studies curricula in use in elementary school. Develops criteria to select appropriate social studies content, skills, and attitudinal objectives. Expects students to use these criteria to develop social studies experiences that meet the developmental needs of learners and to shed light on the lives of individuals and groups within different cultural settings. *Prereq.* ED 1406.

ED 1410 Methods and Materials for Teaching Adolescents and Adults 1 4 QH

Considers specific methods and materials appropriate to teaching adolescents and adults. Seeks to develop in the students an understanding of the complexities of the materials and methodology of the teaching-learning process, to encourage within students attitudes conducive to and identified with good tenets of teaching, and to foster in the students acceptance of the need to grow constantly and to be aware of the continuing development of the learning-teaching process. Requires fieldwork. *Prereq.* ED 1104.

ED 1411 Methods and Materials for Teaching Adolescents and Adults 2 4 QH

Focuses on the various subject areas of teaching techniques of organizing and presenting lessons, developing teaching materials, using audiovisual equipment, developing and implementing evaluation instruments, and selecting appropriate materials within the field of interest. Requires fieldwork. *Prereq.* ED 1410.

ED 1412 Fundamentals of Curriculum Development 4 QH

Examines how goals and objectives are selected and priorities are determined. Analyzes methods for designing educational programs to meet specified goals, methods of evaluating educational outcomes in terms of the goals of the program, and techniques for modifying programs in the light of such performance.

ED 1414 Current Issues in Teaching the Gifted and Talented 4 QH

Examines issues that affect the type and quality of education available to the gifted and talented in the United States. Describes and evaluates various approaches and programs and reaches conclusions about their effectiveness. Examines research findings on the needs of this segment of the population of learners in order to provide some criteria for future curriculum development.

ED 1417 Student Teaching Practicum and Seminar 8 QH

Allows for full-time participation in a University-arranged and supervised school program designed to analyze learning and teaching and to demonstrate, evaluate, and develop teaching skills. *Prereq.* Advanced professional sequence with minimum 2.5 QPA and C- in each certification course.

ED 1423 Multicultural Education**4 QH**

Reviews aspects of the history and culture of different ethnic groups to explore the manner in which certain themes and issues are manifested. Examines and evaluates ethnic and multicultural school curricula in relation to specific educational criteria and goals and their potential impact on learners. Requires students to select and organize historical, literary, and artifact materials from specific ethnic groups and to use them in the planning of learning experiences for classroom use.

ED 1425 Elementary School Mathematics and Science**4 QH**

Focuses on methods and materials of mathematics and science teaching for early childhood and elementary education majors. Provides the opportunity for university students to explore various strategies and materials of teaching mathematics and some content areas in science. Takes into account the development stages of children.

ED 1426 Fundamentals of Reading**4 QH**

Introduces developmental reading for prospective early childhood and elementary teachers. Studies beginning reading, word recognition, comprehension, and study skills. Introduces materials of instruction, methods of teaching, testing, and grouping.

ED 1800 Directed Study 1**4 QH**

This experience is provided for the student whose unique academic needs or interests cannot be adequately satisfied in any of the scheduled courses of the department. Preparation consists of approval of the supervising faculty member and the dean's office. Approval forms must be submitted to the dean's office during the quarter prior to registration for the directed study. *Prereq. Permission of instructor.*

ED 1801 Directed Study 2**4 QH**

For students who have completed ED 1800.

English

Unless otherwise indicated, the prerequisite for upperclass courses is a freshman English sequence. For undergraduate students in the full-time day programs this means ENG 1110 and ENG 1111; ENG 1013, ENG 1014, and ENG 1111; ENG 1110, ENG 1014, and ENG 1111. For the College of Engineering, ENG 1111 and ENG 1113, and for international students, ENG 1004, ENG 1005, and ENG 1006.

ENG 1001 Intensive English as a Second Language**0 QH**

Reviews English grammar to help non-native speakers to develop listening, speaking, reading, writing, and studying skills. Includes language lab and small-group tutorials.

ENG 1004 Fundamentals of English for Non-Native Speakers**4 QH**

Provides intensive practice in composition with accent on accurate, intelligible writing and paragraphs organized around single, well-supported ideas. Encourages sentence-combining and vocabulary development, and gives special attention to individual writing needs. Includes prose readings, class discussion, and selective review of grammar. *Prereq. Special placement for non-native speakers whose performance or scores indicate that their writing skills are not yet up to those required for ENG 1005.*

ENG 1005 English for International Students 1**4 QH**

Emphasizes the development of skills needed in writing clear, expository prose essays. Requires the regular writing and rewriting of essays of increasing length and complexity. Focuses on appropriate prose readings for discussion and analysis and introduces techniques preparatory to research writing. *Prereq. ENG 1004 or special placement.*

ENG 1006 English for International Students 2**4 QH**

Introduces the study of literature through close reading and discussion of fiction, nonfiction, and poetry. Advances development of rhetorical techniques by requiring frequent essays written in relation to the readings and rewritten to improve content, organization, and diction. Provides guided experience with using outside sources and library materials for writing a term paper. *Prereq. ENG 1005 or equivalent.*

ENG 1013 Fundamentals of English 1**4 QH**

Offers an introduction to principles of the writing process. Emphasizes individualized assistance in generating and developing ideas, drafting, revising, and organizing and mastering the conventions of written English. *Prereq. Special placement.*

ENG 1110 Freshman English 1**4 QH**

Focuses on the individual student's writing skills. Includes application of important principles of composing, logic, and rhetoric to exposition and argumentation. Reviews sentence structure, punctuation, and paragraphing. Analyzes essay forms and problems.

ENG 1111 Freshman English 2**4 QH**

Continues instruction in writing, with emphasis on expository methods of defining, describing, analyzing, persuading, and composing the research paper. Requires students to write lengthy critical essays based on consideration of primary and secondary materials. Focuses on poems, stories, and plays as the subject matter for discussion of writing technique and written assignments. ENG 1111 follows ENG 1110 and is required of all freshmen in the University. *Prereq. ENG 1110.*

ENG 1113 Great Themes in Literature**4 QH**

Explores a theme in literature through a number of illustrative works from the past and the present. Develops techniques of research and documentation. *Prereq. Engineering majors only.*

ENG 1115 Poetry**4 QH**

Involves close reading of selected poems, study of critical terms, and practice in different critical approaches to poetry; examines techniques for reading a variety of poetic texts. (II) *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1116 Fiction**4 QH**

Involves close reading of selected novels and short stories, study of critical terms, and practice in different critical approaches to fiction. (II) *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1117 Drama**4 QH**

Involves close reading of selected plays, study of critical terms, and practice in different critical approaches to drama. (II) *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1118/LIN 1118 Introduction to Language and Linguistics 4 QH

Introduces students to their unconscious linguistic knowledge about sentence structure (syntax), meaning (semantics), word forms (morphology), and speech sounds (phonology). Examines other issues related to language such as the Black English/Standard English debate, women's and men's language, "talking" chimpanzees, "talking" computers, and the nature/nurture controversy. (II)

ENG 1119/LIN 1119 History of the English Language 4 QH

Studies the development of modern English from Anglo-Saxon beginnings; effects of Scandinavian and Norman invasions; dialect geography; evolutionary changes, word formation, and borrowing; and origins of writing and problems of spelling. Readings include both formal and informal writings, literary selections, wills, journals, and private and public letters. (III) *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1120 Survey of English Literature I 4 QH

Surveys the major British writers and major literary forms and works from the Middle Ages to the end of the eighteenth century. Includes works by such writers as Chaucer, Spenser, Shakespeare, Milton, Pope, and Swift. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1121 Survey of English Literature 2 4 QH

Surveys the major British writers and major literary movements from the romantic period through the Victorian and modern periods to the present. Includes works by such writers as Wordsworth, Coleridge, Keats, Browning, Tennyson, Yeats, Lawrence, Lessing, and Beckett. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1123 Survey of American Literature I 4 QH

Surveys the major American writers and major literary forms and works from the colonial period to the Civil War. Includes works by such writers as Bradstreet, Taylor, Cooper, Poe, Hawthorne, Melville, and Emerson. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1124 Survey of American Literature 2 4 QH

Surveys the major American writers and major literary forms and works from the Civil War to the mid-twentieth century. Includes works by such writers as Whitman, Dickinson, Twain, James, Hemingway, Fitzgerald, Faulkner, and Wright. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1125 Technical Writing 4 QH

Trains writers in the clear, unambiguous style of technical writing. Requires students to practice these skills by writing technical proposals, process descriptions, feasibility and program reports, and operators' manuals and by making oral presentations. *Prereq.* ENG 1110 and ENG 1111 and 80 QH.

ENG 1126 Backgrounds in English and American Literature 4 QH

Examines in translation Greek, Roman, and biblical literature as background for literary study. Emphasizes the development of myth, genre, and theme. Readings include Homer, Virgil, Ovid, the most influential parts of the Bible, and Dante. (III) *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1275 Grammar for Journalists 4 QH

Reviews the mechanics of newspaper and magazine prose. Emphasizes grammatical forms, punctuation, spelling, effective

structures, and conventional usage. *Prereq.* Journalism majors only.

ENG 1276 Science Fiction 4 QH

Traces the development of various science fiction themes and approaches, from early man versus machine and love/hate relationships to alien close encounters of all kinds. From *Frankenstein* to most recent titles. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1277 Topics in Science Fiction 4 QH

Focuses on a single writer or group of writers (such as Wells or writers of contemporary American science fiction), a theme (such as women in science fiction or the future city), or a unifying idea (such as time travel or utopia/dystopia). *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1278 Modern Bestseller 4 QH

Explores the function of quest, romance, and adventure in a selection of contemporary bestselling fiction. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1279 The Modern Novel 4 QH

Studies the major British and American novelists of the twentieth century. Considers theme and form in such authors as Lawrence, Woolf, Fitzgerald, Ellison, Doctorow, and Didion. (III) *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1280 Modern Drama 4 QH

Studies the development of drama from realism to surrealism, from Ibsen to Beckett. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1281 The Modern Short Story 4 QH

Studies the short story from Poe to the present, including such writers as Joyce and Kafka, Hemingway and Flannery O'Connor. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1283 Contemporary Fiction 4 QH

Examines British and American writers from 1945 to the present, including such figures as Lessing, Burgess, Pynchon, and Barth. Emphasizes experimental and modernist authors. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1285 Literature and the Law 4 QH

Investigates the problems of crime and justice as reflected in literature, from ancient to contemporary works. The secondary focus is the law itself as literature, including explorations of case files and other legal material. The readings encourage students to discover the changing nature of the criminals—heroes or victims or villains—and to deal with the social, psychological, and political facts that define them. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1286 Literature and Politics 4 QH

Explores how authors from Sophocles to Mailer represent the religious, moral, and ethical conflicts arising from the acquisition, use, and misuse of political power. Considers literature in several categories: utopian, which establishes a conflict between the ideal and the real; satirical, which threatens a power structure by exposing it to scorn; analytic, which describes the rise to and fall from power of individuals, parties, or states; and investigative, which takes the reader inside a power elite to observe its inner operations. Participants examine the difference between the ideal

of government and its reality. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1287 The Literature of Science 4 QH

Examines historically the discovery methods and models of literature and science, exploring one or more of the following areas: the relationship of the methods and models of literature and science; the treatment of scientific methods and models in literature; the use of literary devices, techniques, and traditions in scientific texts. Readings will be drawn from historically significant scientific texts, literary texts, or some combination of these. (VI) *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1288 Film and Text 4 QH

Studies either the similarities and differences between literary texts and film versions of those texts or the interrelations between film and literature as means of cultural expression during a specific historical period. For example, students might compare Doctorow's *Book of Daniel* to the film version, *Daniel*, or they might study books and movies of a period like the sixties that reflect the spirit of the era (*Catch-22*, *The Graduate*). *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1289 Shakespeare on Film 4 QH

Examines the various treatments of Shakespeare's plays on film. Treats the technical aspects of film and how these are used by directors to transfer Shakespeare's plays from the stage to the screen. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1290 Topics in Film 4 QH

Studies a theme or problem (film and society, film and politics), a period in film history (American film from 1945 to the present), a film genre (the western, film noir), or a film director (Hitchcock, Coppola). *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1293 Topics in Popular Culture 4 QH

Focuses on such topics as the soap opera, the western, and the police story; on a popular culture activity; or on a popular culture perspective. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1294 Modern Film 4 QH

Studies a selection of major modern films from around the world from a thematic, cultural, and historical perspective. Special attention is given to political, social, ethical, and psychological issues, as well as to the way common human themes emerge in quite diverse cultures. The course also covers the basic procedures of film interpretation. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1300 Topics in Fiction 4 QH

Studies a particular kind of fiction, such as the novella; a problem in fiction, such as the role of the narrator; a particular group of fiction writers; or a theme in fiction.

ENG 1307 Approaches to Literature 4 QH

Examines ancient and modern theories of literature. Includes selections from the criticism of Plato, Aristotle and the Romantics, as well as from Marxist, Freudian, Jungian, and formalist theories.

ENG 1309 Topics in Literary Criticism 4 QH

Studies a specific problem method or school of criticism, such as structuralism or archetypal criticism.

ENG 1340 Writing Workshop 1 QH

Emphasizes the writing process: multiple drafts, revision, editing, and publication. Students will write one long paper, often in

conjunction with an assigned paper in another course, that will be produced in a class booklet at the end of the quarter. *Prereq.* 80 QH and Pharmacy, Physical Therapy, or Engineering majors.

ENG 1350 Intermediate Writing 4 QH

Provides writing instruction in an interdisciplinary course in which students develop papers on topics relating to their majors. Led by English faculty, students will also read and respond to essays from various disciplines. Writing will be guided in stages from proposal through finished product. *Prereq.* ENG 1110 and ENG 1111 and 80 QH.

ENG 1351 Creative Writing 4 QH

Gives the developing writer an opportunity to practice writing various forms of both poetry and prose. Features in-class discussion of student work. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1352 Advanced Writing 4 QH

Offers an opportunity for experienced writers to hone their skills and develop their interests in different forms and subjects. *Prereq.* ENG 1350 or permission of instructor.

ENG 1357 Poetry Workshop 4 QH

Advanced workshop in writing and examining original student poetry. Students experiment in established poetic forms and compose their own work. *Prereq.* ENG 1351 or permission of instructor.

ENG 1360 Topics in Writing: Reading and Writing Nonfiction 4 QH

Combines literary analysis and creative writing. Concentrates on subjects of twentieth-century nonfiction prose such as politics, science, "culture," athletics, and natural history. Considers authors such as Elizabeth Drew, Russell Baker, and Stephen Jay Gould. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1361 The Writing Process 4 QH

Explores writing in theory and practice. Students observe writers at work and tutor students in the Writing Center as part of the course work. *Prereq.* ENG 1110 and ENG 1111 or equivalent and 80 QH.

ENG 1362 Publication Arts 4 QH

Acquaints students with basic publishing skills. Each student chooses an area of specialization, such as fiction, medicine, law, or engineering, in order to develop skill in editing manuscripts. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1370 Technical Writing 2 4 QH

Offers an opportunity for students to develop technical writing skills in a particular subject or form. *Prereq.* ENG 1125 or permission of instructor.

ENG 1371 Writing for the Computer Industry 4 QH

Focuses on computer documentation, covering general information and operating and programming instructions. Includes graphics, layout, testing, and revision. *Prereq.* ENG 1125 or permission of instructor and one computer science course.

ENG 1381 Writing for the Professions: Business Administration 4 QH

Allows students to gain professional writing experience similar to that of the workplace. Relies on the process approach to writing and features an extended simulation, which integrates common written and oral communication through practical application. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

- ENG 1382 Writing for the Professions: Criminal Justice** 4 QH
Provides students in the College of Criminal Justice with instruction in writing a variety of professional forms. *Prereq.* ENG 1110 and ENG 1111 or equivalent.
- ENG 1400 Topics in Genre** 4 QH
Explores the characteristics of a particular literary form over time through works by various authors. *Prereq.* ENG 1110 and ENG 1111 or equivalent.
- ENG 1401/LIN 1401 Introduction to Syntax** 4 QH
Offers an introduction to syntax, the structural rules of a language. Develops and tests syntactic theory which, like other scientific theories, seeks to explain why things are the way they are. The question underlying the investigation is: how do the structures of language relate to the structure of the human mind? (V) *Prereq.* ENG 1110 and ENG 1111 or equivalent.
- ENG 1402/LIN 1402 Grammars of English** 4 QH
Provides a study of the rules of sentence construction in English, contrasting the traditional framework with current linguistic models. Students will have the opportunity to prepose, postpose, and extrapose as they learn to manipulate grammatical constructs. *Prereq.* ENG 1110 and ENG 1111 or equivalent.
- ENG 1407/LIN 1407 Introduction to Semantics** 4 QH
Focuses on meaning and how it is expressed in language—through words, sentence structure, intonation, stress patterns, and speech acts. How do content, logic, and speakers' and listeners' assumptions affect what sentences can mean? In what ways is linguistic meaning determined by our perceptual system or our culture? *Prereq.* ENG 1110 and ENG 1111 or equivalent.
- ENG 1408/LIN 1408 Topics in Linguistics** 4 QH
Examines closely one of a range of topics from the perspective of current linguistics: American dialects, language and law, women's and men's language, words and word structures, or issues in linguistics and literature. *Prereq.* ENG 1110 and ENG 1111 or equivalent.
- ENG 1409 American Novels 1** 4 QH
Focuses on the themes, forms, and techniques of major American novelists of the nineteenth and early twentieth centuries, such as Cooper, Hawthorne, Melville, Twain, and James. *Prereq.* ENG 1110 and ENG 1111 or equivalent.
- ENG 1410 American Novels 2** 4 QH
Studies the modern and contemporary American novel. Considers such writers as Cather, Hemingway, Fitzgerald, Faulkner, Bellow, and Baldwin. (III) *Prereq.* ENG 1110 and ENG 1111 or equivalent.
- ENG 1411 English Drama 1** 4 QH
Surveys representative English drama, excluding Shakespeare, from *Everyman* to Goldsmith and Sheridan. Analyzes dramatic forms as well as the role of the Elizabethan theaters, dramatic conventions, audience content, and acting styles in Restoration farces. *Prereq.* ENG 1110 and ENG 1111 or equivalent.
- ENG 1412 English Drama 2** 4 QH
Surveys representative English drama of the nineteenth and twentieth centuries. Charts the development of the genre from the nineteenth century to the present and discusses themes and forms. *Prereq.* ENG 1110 and ENG 1111 or equivalent.
- ENG 1550 Psychology and Literature** 4 QH
Concentrates on twentieth-century novels and short stories that stress individual behavior and motivation and reveal human mental and emotional processes. Includes such writers as Kafka, Dostoevski, Faulkner, Conrad, and Lawrence. Same as INT 1707.
- ENG 1551 Gender Roles in Literature** 4 QH
Investigates the relation between sex roles and literary portrayals. Selections represent male and female writers and provide a culturally comparative perspective. *Prereq.* ENG 1110 and ENG 1111 or equivalent.
- ENG 1552 Fantasy** 4 QH
Studies the theory and practice of fantasy as found in the works of such writers as Swift, Carroll, C.S. Lewis, Orwell, and Tolkien. *Prereq.* ENG 1110 and ENG 1111 or equivalent.
- ENG 1557 Topics in Fantasy** 4 QH
Explores such areas as dreams, nightmares, and borderline states of consciousness in the works of such writers as Poe and Kafka. *Prereq.* ENG 1110 and ENG 1111 or equivalent.
- ENG 1558, ENG 1559 Literature in Context** 4 QH each
Attempts to place the writer in the context of a special theme. For example, students might discuss a group of authors influenced by their common interest in psychoanalysis, by their social consciousness, or by an interest in the Wild West and the settlement of America. *Prereq.* ENG 1110 and ENG 1111 or equivalent.
- ENG 1600, ENG 1601 Topics in Literature** 4 QH each
Experiments with subjects and themes such as the censored novel, the Holocaust, alienation, and popular song lyrics. *Prereq.* ENG 1110 and ENG 1111 or equivalent.
- ENG 1602, ENG 1607 Major Figure** 4 QH each
Examines in detail the work of one writer such as Mark Twain, Virginia Woolf, or Eugene O'Neill. *Prereq.* ENG 1110 and ENG 1111 or equivalent.
- ENG 1608 The City in Literature** 4 QH
Examines the city in literature as it has been depicted from ancient times to the present, from Plato to Barthelme. Discusses such themes as the city as a locus of evil, the city as a place of possibility, and the city as a center of art and an influence on creative form in an interdisciplinary fashion. *Prereq.* ENG 1110 and ENG 1111 or equivalent.
- ENG 1609 Contemporary American Literature** 4 QH
Studies major movements in American poetry and fiction since 1945. Considers such poets as Plath, Ginsberg, and Ashbery, and such novelists as Morrison, Pynchon, and Vonnegut. *Prereq.* ENG 1110 and ENG 1111 or equivalent.
- ENG 1610 Early American Literature** 4 QH
Examines American literature of the colonial and federal periods, including Bradford, Taylor, Edwards, Franklin, Wheatley, Irving, and Bryant. *Prereq.* ENG 1110 and ENG 1111 or equivalent.
- ENG 1611 New England Renaissance** 4 QH
Studies the development of a native tradition in the context of democratic and romantic attitudes toward experience and the paradox these attitudes reveal. Includes such writers as Emerson and Thoreau, Hawthorne, and Melville. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1612 American Realism**4 QH**

Examines the realistic tradition in American literature, including local color and native humor, from the end of the Civil War to the turn of the century. Includes such writers as Twain, James, Howells, Crane, and Norris. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1617 Modern American Literature**4 QH**

Studies major developments in American poetry and fiction from 1900 to 1945. Considers such poets as Frost, Eliot, Stevens, and Moore, and such novelists as Hemingway, Faulkner, Fitzgerald, and Porter. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1618 Children's Literature**4 QH**

Studies the history of children's literature in the English language, with special attention to matters such as genre theory and critical approaches. Includes such works as *Alice in Wonderland*, *Uncle Remus*, *Little Women*, and *The Wizard of Oz*. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1619 Topics in Children's Literature**4 QH**

Focuses closely on a specific collection of stories (such as *Grimm's Fairy Tales*), on a specific genre (such as boys' books), on a specific issue (such as the problem of evil), or on children's literature as a form of group socialization. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1621 Nineteenth-Century British Fiction**4 QH**

Studies theme and form in the major English novels of the nineteenth century, considering such authors as the Brontës, Charles Dickens, George Eliot, and Thomas Hardy. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1622 Major Twentieth-Century British Novelists**4 QH**

Introduces students to British fiction from Joseph Conrad to John Fowles, including such writers as D.H. Lawrence, Virginia Woolf, and others less well known. The aim of the course is to show how novels as artistic creations shape their own worlds while helping us to understand ourselves. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1627 Medieval English Literature**4 QH**

Surveys the major works of medieval English literature. Includes works such as *Sir Gawain*, *Piers Plowman*, and *Pearl*. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1628 Chaucer**4 QH**

Surveys the work of Chaucer, with particular emphasis on the *Canterbury Tales*. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1629 Topics in Chaucer**4 QH**

Examines closely a particular work or group of works (such as *Troilus and Criseyde*) or a theme (such as Chaucer's symbolism). *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1630 Milton**4 QH**

Concentrates on Milton's *Paradise Lost*, with supplementary readings in his minor poetry and prose. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1631 Topics in Medieval Literature**4 QH**

Focuses on a genre (such as romance or debate literature), a theme (such as alchemy or King Arthur), or other narrow topics. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1632 Sixteenth-Century Literature**4 QH**

Concentrates on sonnets, love lyrics, and erotic narrative poetry, principally by Wyatt, Sidney, Marlowe, Spenser, and Shakespeare. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1637 Seventeenth-Century English Literature**4 QH**

Examines major writers of the period, such as Bacon and Jonson, Donne and Herbert, Milton and Dryden. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1639 Eighteenth-Century English Literature**4 QH**

Surveys the Augustan age of comic masterpieces. Includes such major writers as Pope, Addison, Steele, Swift, Goldsmith, Burns, Johnson, and Boswell. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1640 Topics in Eighteenth-Century Literature**4 QH**

Examines closely a single writer or group of writers (such as Fielding or the essayists), a genre (such as satire), a theme (such as reason and madness), or other narrow topics. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1641 Romantic Poetry**4 QH**

Surveys the development of English Romantic poetry, both in its lyric and longer forms, in Blake, Wordsworth, Coleridge, Byron, Shelley, and Keats. Emphasizes problems of belief and the relationship of the individual to the surrounding world of natural, social, and historical process. (V) *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1647 Victorian Literature**4 QH**

Surveys the major issues and writers of Victorian England, considering such writers as Tennyson and Browning, Dickens and the Brontës, G.M. Hopkins, and Oscar Wilde. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1648 Topics in Victorian Literature**4 QH**

Examines closely a single writer or group of writers (such as Arnold or the fantasists) or a theme (such as the movement toward modernism or decadence). *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1649 World Literature 1**4 QH**

Surveys world literature from the time of the Greeks through the Renaissance, from Homer to Cervantes. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1650 World Literature 2**4 QH**

Surveys world literature from the Renaissance through the modern period, from Voltaire to Brecht. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1652 Twentieth-Century English Literature**4 QH**

Surveys the best and most interesting work of twentieth-century British writers such as William Butler Yeats, D.H. Lawrence, W.H. Auden, Doris Lessing, and Iris Murdoch. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1658 Introduction to Shakespeare**4 QH**

Covers a selection of the major plays of Shakespeare, including both tragedies and comedies. (III) *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1659 Shakespeare's Comedies	4 QH	ENG 1713 Great Themes in Literature (Honors)	4 QH
Studies the romantic comedies, problem comedies, and romances, ranging from <i>The Merchant of Venice</i> to <i>The Tempest</i> . <i>Prereq.</i> ENG 1110 and ENG 1111 or equivalent.		Honors equivalent of ENG 1113.	
ENG 1660 Shakespeare's Tragedies	4 QH	ENG 1721 Survey of English Literature 2 (Honors)	4 QH
Studies the nature of the tragic hero, the questioning of social norms, and the landscape of chaos, ranging from <i>Julius Caesar</i> to <i>Coriolanus</i> . <i>Prereq.</i> ENG 1110 and ENG 1111 or equivalent.		Honors equivalent of ENG 1121.	
ENG 1661 Topics in Shakespeare	4 QH	ENG 1723 Survey of American Literature 1 (Honors)	4 QH
Examines closely such topics as the history plays, Shakespeare in performance, the Shakespearean hero, and psychological approaches to Shakespeare. <i>Prereq.</i> ENG 1110 and ENG 1111 or equivalent.		Honors equivalent of ENG 1123.	
ENG 1662 The Bible	4 QH	ENG 1725 Technical Writing (Honors)	4 QH
Studies books of both the Old Testament and the New Testament as literature and as history. <i>Prereq.</i> ENG 1110 and ENG 1111 or equivalent.		Honors equivalent of ENG 1125.	
ENG 1667 Modern Poetry	4 QH	ENG 1750 Intermediate Writing (Honors)	4 QH
Studies the modernist tradition in American and British poetry. Considers such writers as Yeats, Hardy, Frost, Eliot, Stevens, Pound, Williams, and Cummings. (III) <i>Prereq.</i> ENG 1110 and ENG 1111 or equivalent.		Honors equivalent of ENG 1350.	
ENG 1677 Contemporary Poetry	4 QH	ENG 1758 Introduction to Shakespeare (Honors)	4 QH
Studies developments in British and American poetry since 1945. Includes such writers as Plath, Ginsberg, Lowell, Bly, Ashbery, and Heaney. (VI) <i>Prereq.</i> ENG 1110 and ENG 1111 or equivalent.		Honors equivalent of ENG 1658.	
ENG 1678 Early African-American Literature	4 QH	ENG 1781 Writing for Business (Honors)	4 QH
Surveys the development and range of black American writers, emphasizing poetry and prose from early colonial times to the Civil War. <i>Prereq.</i> ENG 1110 and ENG 1111 or equivalent.		Honors equivalent of ENG 1381.	
ENG 1679 Modern African-American Literature	4 QH	ENG 1810, ENG 1811 Directed Study	4 QH each
Surveys the development and range of black American writers, emphasizing poetry and prose from the post-Civil War period to the present. <i>Prereq.</i> ENG 1110 and ENG 1111 or equivalent.			
ENG 1690, ENG 1691 Junior/Senior Seminar	4 QH each		
(First preference given to students needing the course to complete the major.) Explores an important aspect of literature such as the writer and the audience, the tradition of the new, style and meaning, and the jazz age. Emphasizes independent research in a seminar setting. <i>Prereq.</i> ENG 1110 and ENG 1111 or equivalent and junior/senior status.			
ENG 1692/LIN 1692, ENG 1693/LIN 1693 Junior/Senior Seminar in Linguistics	4 QH each		
Explores important aspects of literature such as the writer and the audience, the tradition of the new style and meaning, and the jazz age. Emphasizes independent research in a seminar setting. <i>Prereq.</i> ENG 1110 and ENG 1111 or equivalent and junior/senior status.			
ENG 1710 Freshman English 1 (Honors)	4 QH		
Honors equivalent of ENG 1110.			
ENG 1711 Freshman English 2 (Honors)	4 QH		
Honors equivalent of ENG 1111.			

Geology

GEO 1119 Marine Resources	4 QH
Provides a qualitative and quantitative survey of renewable and nonrenewable resources from the sea. Aspects covered include offshore oil and gas utilization, marine minerals, tidal power, and coastal zone recreational resources, including polluted beaches and artificial fishing reefs.	
GEO 1120 Physical Oceanography	4 QH
Provides a description of the physical properties and composition of sea water, waves, tides, and ocean currents. Discusses how these properties are measured by oceanographers and how they influence the earth's environment and climate.	
GEO 1121 Biological Oceanography	4 QH
Covers the productivity of animal and plant life in the various zones of the ocean and the growing economic importance of the oceans as a source of food for the expanding world population.	
GEO 1122 New England Fishery Resources	4 QH
Provides an overview of the fisheries industry of New England. Emphasizes environmental factors controlling the distribution, quality, and abundance of fisheries resources. Discusses the methods and the effects of direct human utilization of the resource as well as the indirect effects of pollution and habitat modification.	
GEO 1128 Geology of Oceans and Coasts	4 QH
Examines the relationship between the form of the ocean basins and their margins and the major processes forming them. Emphasizes local landforms, including New England beaches, spits, barrier islands, and the continental shelf. (II)	
GEO 1140 Environmental Geology	4 QH
Discusses how geologic processes acting at the Earth's surface interact with the human environment. Topics include river and ocean flooding, coastal erosion, landslides, land-use planning, and waste disposal.	

- GEO 1141 Geological Hazards and Resources** 4 QH
Discusses how geologic processes originating deep inside the Earth interact with the human environment. Topics include global crystal movements, volcanic and earthquake hazards, mineral resources, coal and oil, geothermal energy, resource management, and disposal of radioactive wastes. (II)
- GEO 1154 Planetary Astronomy** 4 QH
Focuses on astronomy of the solar system. Topics include description of the planets and other objects, with discussion of how our understanding has evolved from the days of naked-eye observation to the present era of interplanetary probes. (V)
- GEO 1208 Age of Dinosaurs** 4 QH
Focuses on major physical and biological events of the Mesozoic Era of earth history. Draws on evidence from the sedimentary rock record to provide a basis for interpretations of Mesozoic life, climates, mountain building, and paleogeography. Demonstrates principles of evolution and extinction through dinosaur paleobiology and history.
- GEO 1212 Physical Geology** 4 QH
Offers a systematic study of the materials comprising the Earth. Emphasizes the processes that form, transport, alter, and destroy rock, as well as the nature and development of landscape. (II)
- GEO 1213 Physical Geology Laboratory** 1 QH
Optional lab for GEO 1212. Exercises pertain to mineral and rock identification and topographic and geologic map interpretation. Required for geology majors. *Prereq.* GEO 1212; *may be taken concurrently.*
- GEO 1222 Historical Geology** 4 QH
Traces the physical and biological history of the earth through geologic time. Major topics are the origin and evolution of life, mountain building, and continental drift. (II)
- GEO 1223 Historical Geology Laboratory** 1 QH
Studies fossil representatives of major invertebrate phyla, application of fossils to studies of rock sequences, interpretation of geologic history from geologic maps and sedimentary rocks. *Prereq.* GEO 1222; *may be taken concurrently.*
- GEO 1250 Advanced General Geology** 4 QH
Offers an introduction to new and advanced concepts, theories, and hypotheses in geology through discussions, research papers, and individual projects. *Prereq.* GEO 1212 and GEO 1222.
- GEO 1308 Petrology** 5 QH
Studies the hand specimen and field identification of the common igneous, sedimentary, and metamorphic rocks. Considers the modes of origin and important properties of common rock types. *Prereq.* GEO 1212.
- GEO 1310 Descriptive Mineralogy** 5 QH
Provides a study of mineralogy, including crystallography and physical, chemical, and descriptive mineralogy of the common rock-forming minerals. *Prereq.* Two quarters of chemistry.
- GEO 1311 Optical Crystallography** 5 QH
Studies the theory and practical methods of optical crystallography, including the basic techniques for determining the optical constants of crystals using the polarizing microscope and immersion media. *Prereq.* GEO 1310.
- GEO 1312 Petrography** 5 QH
Covers description and identification of rocks and rock-forming minerals using thin-sections and the petrographic microscope; discussion of textural and mineralogic relationships. *Prereq.* GEO 1311.
- GEO 1320 Field Geology** 4 QH
Focuses on field techniques as a working guide for the approach, pursuit, and solution of geologic problems. Considers such techniques as geologic map construction, stratigraphic section measurement, and field rock description. Lab consists of field research at a quarry, roadcut, or other geologic exposure. *Prereq.* GEO 1212.
- GEO 1412 Geochemistry** 4 QH
Offers an evaluation of chemical processes important in the various geologic environments and their effects on the development of the lithosphere. *Prereq.* One year of chemistry.
- GEO 1414 Igneous and Metamorphic Petrology** 5 QH
Covers the origin and distribution of igneous and metamorphic rocks as interpreted from their chemistry, mineralogy, and field relationships. Lab includes field and petrographic analysis of rock suites. *Prereq.* GEO 1312.
- GEO 1418 Structural Geology** 5 QH
Covers the description and origin of large- and small-scale rock structures with emphasis on interpretation of the mechanics of deformation. Field and lab analyses of structural problems using maps, models, and rock specimens. *Prereq.* GEO 1212 and GEO 1213.
- GEO 1420 Geophysics** 4 QH
Studies the basic techniques of reflection and refraction seismology, gravity, aeromagnetic, and heat-flow techniques and the information they provide on the structure, composition, and dynamics of the Earth's interior. Emphasizes the application of these techniques to the search for economic minerals in the earth's crust. *Prereq.* PHY 1231.
- GEO 1424 Stratigraphy** 5 QH
Offers a study of paleoenvironments and sedimentary-basin analysis based on sedimentary structures, stratigraphic sequences, and fossils. Emphasizes use of geologic sections, drill-cores, and well-logs. Includes lab interpretation of sedimentary rock suites, maps, and sections. *Prereq.* GEO 1222.
- GEO 1428 Invertebrate Paleontology** 5 QH
Surveys major invertebrate phyla preserved in the fossil record. Discusses micro- and macro-evolutionary principles with consideration of adaptive and functional morphology and the role of paleoenvironments. Lab involves description and classification of fossil invertebrates. *Prereq.* GEO 1222.
- GEO 1430 Sedimentation and Sedimentary Environments** 5 QH
Describes the physical processes of sedimentation and their role in the interpretation of modern and ancient sedimentary environments. Lab concentrates on the interpretation and description of the physical and textural properties of sediments and sedimentary rocks.
- GEO 1432 Sedimentary Petrology** 5 QH
Covers origin, classification, and petrography of the major groups of sedimentary rocks. Discusses the environments of deposition

of the nonclastic rocks. Lab concentrates on thin-section study of sedimentary rocks. *Prereq.* GEO 1311.

GEO 1435 Coastal Processes 5 QH
Examines the effect of coastal marine processes and the resultant coastal responses. Topics include the dynamics of waves and currents and the associated erosion, transportation, and deposition of sediment, forming beaches, barrier islands, and cliffed structures. *Prereq.* GEO 1212.

GEO 1436 Marine Geology 4 QH
Compares the balance between major sedimentary and tectonic forces in ocean basins and margins to resulting ocean form. Topics include origin of continental shelves, shelf sedimentation and transport, deep-sea processes and sediments. Evaluates resource development of OCS oil, sand and gravel, and manganese nodules. *Prereq.* GEO 1212.

GEO 1438 Geology and Land-Use Planning 4 QH
Studies the causes and solutions of geologic environmental problems related to land use. Topics include the causes and prevention of land-use problems in areas of existing or potential landslides, subsidence, erosion, flooding, and groundwater pollution. *Prereq.* GEO 1140, GEO 1212, or permission of instructor.

GEO 1440 Geomorphology 5 QH
Focuses on the origin and evolution of landscape features by processes operating at or near the Earth's surface. *Prereq.* GEO 1212.

GEO 1442 Water in Environmental Planning 4 QH
Examines aspects of surface runoff from geomorphic and hydrologic perspectives. Develops methods for description and calculation of major river and drainage basin processes and applies the results to the planning process. Examines human modification of these systems, including urbanization, dams, and channelization, and applies this information to an understanding of regulatory processes. (VI) *Prereq.* GEO 1212 or permission of instructor.

GEO 1444 Glacial and Pleistocene Geology 5 QH
Covers the processes of ice movement and the characteristics and distribution of erosional and depositional structures associated with past and present glaciers; introduces Pleistocene chronology and correlations. *Prereq.* GEO 1222.

GEO 1446 Hydrogeology 4 QH
Covers origin, distribution, and flow of groundwater in permeable sediments and bedrock; hydrological and geological characteristics of aquifers; regional flow systems emphasizing rock structure, stratigraphy, and other aspects of the geological environment; principles of hydrogeology mapping and analysis; and introduction to well design and well hydraulics. *Prereq.* GEO 1212, MTH 1107 or 1123, or permission of instructor.

GEO 1447 Groundwater Modeling 4 QH
Uses computers to solve problems in the flow of groundwater. Develops concepts of groundwater flow. Uses the finite-difference method to model steady-state and transient flow. Programs are supplied by the instructor so programming skill is not a prerequisite. *Prereq.* Introductory calculus.

GEO 1448 Groundwater Geochemistry 4 QH
Investigates important geological processes (formation of soil, ore deposits, caves, sinkholes) that occur when groundwater interacts

with rock or soil, modifying groundwater chemistry and affecting water quality. Examines groundwater contamination and dispersion, isotope tracer studies, field sampling, and analytical methods. *Prereq.* Two quarters of chemistry.

GEO 1450 Geology Seminar 4 QH
Offers in-depth study, on an individual or small-group basis, of a selected geologic topic. Requires both oral and written presentations. *Prereq.* Major in geology or senior status.

GEO 1712 Physical Geology (Honors) 4 QH
Honors equivalent of GEO 1212. (II)

GEO 1722 Historical Geology (Honors) 4 QH
Honors equivalent of GEO 1222. (II)

GEO 1754 Planetary Astronomy (Honors) 4 QH
Honors equivalent of GEO 1154. (V)

GEO 1816, GEO 1817 Undergraduate Research 4 QH each
Offers independent research on a selected topic under the direct supervision of a faculty member. *Open only to juniors and seniors majoring in geology, with the recommendation of the supervising faculty member and of the department.*

GEO 1820, GEO 1821 Directed Study 4 QH each
Offers independent study of a specific topic not normally contained in the regular course offerings, but within the area of competence of a faculty member. *Open to all students with the recommendation of a faculty member and departmental approval.*

GEO 1824, GEO 1825 Special Studies 1 QH each
Offers independent study of a specific topic. *Open to all students with the recommendation of a faculty member and departmental approval.*

GEO 1830, GEO 1831, GEO 1832, GEO 1833 Junior/Senior Honors Project 4 QH each
For details contact the honors office.

History

HST 1101 Western Civilization to 1648 4 QH
Surveys Western lifestyles, events, institutions, and culture from the earliest human societies through the end of the Thirty Years War. Focuses on Bronze Age civilizations and the origins of universalist religions, Greco-Roman civilization, early Christianity, Islam, the Germanic and Arab successor states to Rome, medieval civilization, the Renaissance and the age of exploration, the Protestant and Catholic reformations, the religious wars that ensued, and the economic transformations that occurred simultaneously. Emphasizes those elements that influenced the development of Western civilization and values. *Not open to students who have completed HST 1121, HST 1701, or HST 4110.* (II)

HST 1102 Western Civilization since 1648 4 QH
Surveys the development of Western—largely European—society and values from the rise of the dynastic and bureaucratic states to current Soviet reforms and the integration of the western European economy. Covers royal absolutism, the rise of the scientific world view, the political and economic revolutions that transformed Europe at the end of the eighteenth century, the

development of nationalism and Marxism, the race for colonies, the cultural transformations of the early twentieth century, World War I and the Russian Revolution, the crisis of capitalism and the rise of fascism, World War II and the Holocaust, the Cold War and decolonization, and the current state of Western civilization. *Not open to students who have completed HST 1122, HST 1702, or HST 4111.* (II)

HST 1121 World Civilization to 1648 4 QH

Surveys the development of human institutions from ancient times through the crisis of the mid-seventeenth century. Emphasizes the continuities and changes that occur within civilization and the similarities, differences, and relationships that exist among contemporary civilizations around the world. Covers such topics as the rise of the world's great religions, the military and trading relationships among the various regions of the ancient and medieval worlds, the economic and technological revival of Europe in the early modern period, and the expanding struggle for resources in the crisis atmosphere of the seventeenth century. *Not open to students who have completed HST 1101 or HST 1701, or HST 4110.* (IV)

HST 1122 World Civilization since 1648 4 QH

Examines the world from 1648 to the present. Emphasizes the intellectual, technological, and political expansion of Europe and the reactions of the rest of the world. Covers such topics as the global development of modern dynastic and bureaucratic states; the expansion of the European economy with its attendant trade wars; imperial expansion and the explosion of the slave trade; the development and reaction of American Indian, Asian, and African civilizations to that imperialism; the sporadic extension and eclipse of colonialism; and the growing tensions between traditional patterns of loyalty and authority and national, regional, and even global systems and cultures as we approach the twenty-first century. *Not open to students who have completed HST 1102, HST 1702, or HST 4111.* (IV)

HST 1201 The United States to 1877 4 QH

Focuses on the history of the American people from 1763 to 1877, with an analysis of the American Revolution and the major political, constitutional, diplomatic, economic, and social problems of the new nation. (II)

HST 1202 The United States since 1877 4 QH

Continues the survey of American history, with discussion of the emergence of an industrial economy, an urban society, world responsibility, and expanded federal government. (II)

HST 1241 The Historian's Craft 4 QH

Examines the ways in which the historian studies the past and the nature of historical statements. Problems considered include research techniques, changing conceptions of historical knowledge, and the relation between the historian and the society in which he/she works. (II)

HST 1270 Introduction to Public History 4 QH

Explores the field of public or applied history by surveying its components, including historic preservation, oral history, historical editing, historical archeology, genealogy, family history, business history, local history, material culture, historical resource management, museology, historical research for media, archival management, management of nonprofit organizations, and policy history.

HST 1301 Topics in European History (Group A or B) 4 QH

Covers topics in European history from antiquity to the present.

HST 1321 Medieval Europe (Group A) 4 QH

Studies Europe from the fall of Rome to the fifteenth century; the expansion of Christianity; the growth of the power of the papacy; the development of monarchies; popular culture, heresy, and witchcraft; crusades; cathedrals, warriors, and saints. Emphasizes cultural and intellectual change. (III)

HST 1331 Renaissance Civilization (Group A) 4 QH

Focuses on Europe from 1300 to 1600. Topics include political, economic, and social changes; advances in technology, science, and warfare; overseas expansion; changes in artistic vision; and struggles over religious and scientific beliefs. Emphasizes cultural and intellectual change. (III)

HST 1355 Tudor England (Group A) 4 QH

Provides a study of England from the late fifteenth to the early seventeenth century. Topics include an examination of the Tudor contribution to the development of political and social institutions; the Protestant Reformation and the relation between religion and politics; social and economic changes and their relation to the Elizabethan Renaissance. Particular emphasis is placed on intellectual and cultural developments and England's relation to Europe and the New World. Provides hands-on experience with Tudor sources.

HST 1390 Population in European History (Group A or B) 4 QH

Examines, through population studies, the causes and consequences of changes in human birth, death, marriage, and migration rates from the Old Stone Age to the late twentieth century. Discusses the interaction and impact of climate change, epidemic disease, war, economic development, and political policy, as well as changes in the structure and function of human family and child-rearing systems. (III)

HST 1393 History of Science and Technology (Group A or B) 4 QH

Offers an interdisciplinary survey of the development of science and technology, integrating theories of the philosophy and sociology of science within a historical framework. Emphasizes the environmental and ideological conditions that contribute to the birth and growth of the various sciences and to the relation between these conditions and technological innovation.

HST 1395 History of Flight and Space Travel (Group A, B, or C) 4 QH

Traces the history of nonpowered flight, beginning with the dreams of flight of the ancient Greeks and Leonardo da Vinci; from the balloon experiments of the Montgolfier brothers to contemporary hang gliders; powered flight from the Wright brothers to the SST; and rocketry and space travel from its earliest beginnings to "Enterprise."

HST 1407 Europe, 1870-1921 (Group B) 4 QH

Focuses on Europe from the Franco-Prussian War to the post-World War I settlement: the growing tensions and rivalries and the declining certainties of the end of the nineteenth century, the origins of World War I, the war itself, the Russian Revolution, and the Peace of Paris.

HST 1408 Europe since 1921 (Group B) 4 QH

Focuses on Europe from the Versailles Settlement: the rise of totalitarianism, the Depression, the crises of liberalism and of the European mind, the Appeasement Era, World War II, the Cold War, the end of colonialism, and Europe today.

- HST 1424 Victorian England (Group B)** 4 QH
Discusses the economic, social, and political life of the English people during Victoria's reign. (IV)
- HST 1425 The Decline of Great Britain (Group B)** 4 QH
Discusses the economic, social, and political life of the English people in the twentieth century. (IV)
- HST 1433 The French Revolution and Napoleon (Group B)** 4 QH
Examines the history of France in the age of the *ancien regime* and the Enlightenment as background for the French Revolution and Napoleon.
- HST 1441 Hitler's Germany (Group B)** 4 QH
Offers a study of the origins and nature of Hitler's Third Reich, emphasizing the personal lives of Nazi leaders in an attempt to understand how seemingly ordinary people could enthusiastically promote wars of aggression and revel in genocidal policies.
- HST 1472 The Family in European History (Group B)** 4 QH
Examines issues in the history of the European family from the late Middle Ages to the present. Topics include marriage and sexuality, child-rearing practices, the effect of industrialization and revolution on family life, the Victorian family, and the evolution of the modern family. Students will prepare their own family histories.
- HST 1473 Women in Modern Europe (Group B)** 4 QH
Examines the history of women in Western Europe from the French Revolution of 1789 to the present, focusing on France, Britain, and Germany. Topics explored include women in revolutionary movements, the impact of industrialization on women and the family, women in the labor movements, the struggle for suffrage, and the effects of world wars on women.
- HST 1481 The Culture of Europe (Group B)** 4 QH
Provides an analysis of the culture of the West in the nineteenth and twentieth centuries, focusing on the conjunction of social, cultural, and psychological forces that encouraged or retarded creativity. Considers the interconnections among the arts, social sciences, and sciences within each of the periods covered. (III)
- HST 1485 Communism and Revolution (Group B)** 4 QH
Focuses on the history of socialism and revolution from the early nineteenth-century utopias to the New Left of the 1960s.
- HST 1490/INT 1150/SOC 1150 Introduction to Women's Studies: Image, Myth, and Reality (Group B or C)** 4 QH
Introduces the issues and methodology involved in the interdisciplinary study of women. Encompasses the historical, political, economic, and social processes that have created both the image and the reality of women in society. Uses guest lecturers to provide an overview of the many disciplinary approaches to the study of women. This course is required for women's studies minors and can be used as a general elective or, depending on the discipline of the coordinator, to satisfy specific concentration requirements. (II)
- HST 1491 Modern Western Economic History (Group B or C)** 4 QH
Surveys the development of the Western world within the framework of economic theory, with attention to social and political ramifications. (III)
- HST 1493 Work and Leisure (Group B or C)** 4 QH
Examines the historical evolution of contemporary patterns of work and leisure across cultural, sexual, and class lines. Topics include the impact of machine technology on the worker and the workplace, workers organizing in unions and professional groups, changing concepts of the use of time, women's work and women's leisure; recreation and sports (both participant and spectator); and the rise of the cafe and the saloon as sociable institutions. (III)
- HST 1494 History and Film (Group B or C)** 4 QH
Explores various historical issues as seen through the eyes of historians and filmmakers. Presents both acted and documentary films in combination with readings from a variety of source and interpretive materials. (II)
- HST 1495 Technological Transformations of Society (Group B, C, or D)** 4 QH
Examines the relation between technological innovations and the world in which they take place. Discusses conditions necessary for discovery and innovation and the impact of technology on political, economic, and social environments.
- HST 1496 War in the Twentieth Century (Group B, C, or D)** 4 QH
Provides an analysis of the causes, prosecutions, and effects of the major wars fought in the twentieth century, concentrating on the First and Second World Wars and on the Vietnam War. Using film, simulations, and other materials, classes explore the economic, social, cultural, and psychological impacts of these wars as well as their political, diplomatic, and material aspects.
- HST 1497 The World since 1945 (Group B, C, or D)** 4 QH
Offers a thematic study of issues and movements that have influenced the world's history since the end of the Second World War. Subjects include the Cold War, the end of colonialism, urbanization, technology and ecology, cultures and counter-cultures, the "global village," and the prospects for human liberation.
- HST 1501 Topics in American History (Group C)** 4 QH
Covers special topics in the history of the people of the United States from 1789 to the present.
- HST 1510 Colonial America (Group C)** 4 QH
Covers the discovery and exploration of the New World, the settlement of the English colonies on the North American mainland, their development to 1763, and the origin of their clash with England. (III)
- HST 1511 The American Revolution (Group C)** 4 QH
Focuses on the coming of the American Revolution, its nature and progress, and its political, economic, and social aftermath.
- HST 1514 The Civil War and Reconstruction (Group C)** 4 QH
Focuses on the events surrounding the southern effort to expand slavery into the territories which led to the Civil War. Emphasizes the significant impact of Abraham Lincoln upon the war's outcome. Also examines Reconstruction, the effort to reunite the North and South at war's end, and explores the major role that African-Americans played throughout the period.
- HST 1516 The United States, 1898-1939 (Group C)** 4 QH
Examines social, economic, political, and diplomatic changes from the Progressive Era through the Great Depression and the New Deal.
- HST 1517 The United States, 1939-1960 (Group C)** 4 QH
Examines social, economic, political, and diplomatic changes from the start of World War II to the election of John F. Kennedy.

- HST 1518 The United States since 1960 (Group C)** 4 QH
Examines social, economic, political, and diplomatic changes in the United States since 1960.
- HST 1525/AFR 1131 African-American History 1 to 1900 (Group C)** 4 QH
Covers the development of black America from slavery through the Booker T. Washington–W.E.B. DuBois controversy, with emphasis on the historical links between Africa and America that have shaped the African-American experience. Includes in-depth discussion of slavery's impact, the role of the antebellum free black, the Civil War and Reconstruction, and the black response to the new racism of the late nineteenth century. (III)
- HST 1526/AFR 1132 African-American History 2 since 1900 (Group C)** 4 QH
Examines the modern development of black America, with major emphasis on the twentieth century and the rising tide of African-American nationalism. Provides an historical perspective regarding key contemporary issues, including the founding of the NAACP, the Marcus Garvey back-to-Africa movement, the Harlem Renaissance, the Black Muslims, the impact of Martin Luther King, and the idea of Black Power.
- HST 1531 New England History (Group C)** 4 QH
Examines the history of New England from its first settlement by Native Americans to its condition in the late twentieth century. Encompasses a variety of topics, including geography, discovery, exploration, settlement, immigration, politics, industrialization, transportation, and urbanization.
- HST 1533 History of Boston (Group C)** 4 QH
Explores the history of Boston from colonial times to the present, with attention to the topographical growth and the ethnic composition of the city.
- HST 1538 History of Latinos(as) in the United States (Group C)** 4 QH
Examines the history and experiences of the major Latino(a) groups—Chicanos, Cubans, and Puerto Ricans—and the new immigrant from Central America and the Caribbean. Studies historical events in the context of the larger “American”—North and South—experience. Topics include United States’ expansion and imperialism in the Southwest and the Caribbean, migration patterns, forms of ethnic nationalism, political participation and mobilization, labor migration, gender and class distinctions, cultural and artistic currents, and the effects of post-industrialization.
- HST 1539 American Jewish History (Group C)** 4 QH
Examines Jewish political, social, and cultural history from the arrival of the first group of Jews at New Amsterdam in 1654 to the present. Themes covered include immigration, assimilation, family life, religion, anti-Semitism, Zionism, the Holocaust, and American-Israeli relations.
- HST 1543 American Urban History (Group C)** 4 QH
Examines the development of urban society in the United States in the nineteenth and twentieth centuries, with emphasis on the effects of immigration and industrialization upon the politics, thought, and society of American cities. (VI)
- HST 1544 Environmental History of the United States (Group C)** 4 QH
Examines American attitudes and practices toward natural and artificial environments from the first exploration to the present, paying special attention to literature, art, and landscape design. (VI)
- HST 1548 American Cultural History to 1860** 4 QH
Studies the major issues in the cultural history of the United States from the seventeenth century to 1860. Topics covered include popular religion, the rise of republicanism, leisure and play, foodways, cross-currents of popular and elite literature and material culture, geographic sectional differences, and the crusade for the Union. Emphasizes the interaction of working-class, middle-class, and elite cultural forms, including music, sermons, literature, prints and paintings, and material culture.
- HST 1549 American Popular Cultural History since 1860** 4 QH
Studies the major issues in the cultural history of the United States from 1860 to the present. Topics to be analyzed include the growth of advertising and consumerism, technological change and its meaning, the rise of sports, suburban life from the 1950s onward, 1960s “counter culture,” and neo-conservatism. Emphasizes the interaction of a wide range of cultural forms, including popular literature and music, film, television, and the mail order catalog.
- HST 1553 The Family in American History (Group C)** 4 QH
Explores the history of the family, including the African-American family, in pre-modern and modern American society. Focuses on the traditional and modern roles of parents and children. Investigates patterns of sexuality, marriage, childrearing, work, play, death, and dying. Compares various family types, including elites, middle class, and indigent. Evaluates external forces affecting family structure and life, such as geographical mobility, industrialization, and warfare.
- HST 1554 Women in America (Group C)** 4 QH
Offers an analysis of women’s economic and social roles from the colonial period to the present, with special attention to women’s work, their roles in family and community, and nineteenth- and twentieth-century women’s rights movements. (III)
- HST 1555 American Elites (Group C)** 4 QH
Examines the life of elite individuals and groups in American society, especially in the nineteenth and twentieth centuries.
- HST 1556 History of the American Home (Group C)** 4 QH
Studies the American home from 1600 to the present. Extensively uses visual materials to develop an above-ground “archeology” of the American home to teach students how things—furnishings, buildings, landscape—contain hidden meanings that can reveal the intimate details of the everyday lives of ordinary and extraordinary Americans. Includes analysis of the ways in which the broader political, economic, and social issues of the past were reflected in Americans’ physical surroundings.
- HST 1563 History of Sport in America (Group C)** 4 QH
Provides a history of the major sports and their impact on American life.
- HST 1575 History of Media in America (Group C)** 4 QH
Focuses on mass communication in American history, with attention to the role of books, newspapers, magazines, films, radio, and television.
- HST 1577 America and the Sea (Group C)** 4 QH
Studies the history of exploration and discovery of America, the development of fishing, the rise of ocean commerce, and the history of the American Navy.

- HST 1578 The Automobile in America (Group C)** 4 QH
Focuses on the impact of the automobile on American society in a historical context. Topics include the abandonment of traditional prohibitions of motorized carriages; the use of planning, taxes, and highway policies to foster the use of the automobile; the effect of the car on land use, recreation, and the economy; and contemporary issues such as pollution and energy.
- HST 1582 The Growth of American Government Since 1935 (Group C)** 4 QH
Examines the expansion of government from Roosevelt to the present, focusing on the reasons for the growth and its consequences, the development of major public policies, and the transformation of the federal role and politics.
- HST 1586 American Military History (Group C)** 4 QH
Surveys the complex relationship between American society and war, from the age of muskets to the neutron bomb.
- HST 1591 American Images of China (Group C or D)** 4 QH
Examines the relations between China and the United States, including the period of the missionaries and opium traders; the era of special privileges; the Open Door policy; the first half of the twentieth century, when China became America's favorite protégé; and the years of strain, warfare, and finally accommodation after the Chinese communists came to power in 1949.
- HST 1592 History of the Vietnam War (Group C or D)** 4 QH
Presents a history of military conflict in Vietnam with attention to the rise of the Viet Minh during World War II, the struggle against the French in the first Indochina war, the impact of the Cold War, and the involvement of the United States after 1950 in Laos and Cambodia as well as Vietnam. Emphasizes the roles of communism and nationalism in Indochina and the motives for American intervention. Films revealing American reaction to the escalating conflict will be shown.
- HST 1604 Latin America: The Modern Period (Group D)** 4 QH
Traces the developments in this region since independence and the inception of nationhood. Topics include: state formation and society in the nineteenth century; economic development and underdevelopment in the region; race, class, and ideology; United States/Latin American relations; populism; the roots of revolution and authoritarianism; and the contemporary experiments with neo-liberal policies.
- HST 1605 Introduction to Caribbean History (Group D)** 4 QH
Focuses on the social, economic, and cultural forces that have shaped the character of the Caribbean people. Examines the variety of societies, cultures, and institutions of the region in their historical and contemporary settings, beginning with pre-Colombian cultures, moving through the colonial period, plantation agriculture, slavery, the expansion of U.S. influence, urbanization, economic development models, authoritarian politics, and the contemporary migration of Caribbean people to the United States and Europe.
- HST 1610 Topics in Asian History (Group D)** 4 QH
Covers special topics in the history of Asia.
- HST 1612 The Modern Middle East (Group D)** 4 QH
Focuses on the Middle East since 1800, with emphasis on the background of present problems. (VI)
- HST 1613 The Contemporary Middle East (Group D)** 4 QH
Focuses on political, economic, and social developments in the Middle East since World War II.
- HST 1614 The Middle East Today in Fact, Fiction, and Film (Group D)** 4 QH
Presents a study of social, economic, and political changes and conflict in the lives of ordinary people who have been experiencing the recent crises reported in the media. Focuses on common experiences among various peoples—Turks, Armenians, Israelis, Arabs, and Iranians—and emphasizes significant themes: lifestyles, generational conflict, the changing role of women, ethnic or ideological conflict, and the prevalence of identity crises attending cultural and social disruption.
- HST 1620/AFR 1191 Early African Civilization (Group D)** 4 QH
Studies the ancient empires of Africa, especially Chana, Songhai, Mali, Zimbabwe, the city-states of East Africa, and the Congo Kingdom. Includes Ethiopian and Egyptian history and controversies to 1800.
- HST 1621/AFR 1197 Modern African Civilization (Group D)** 4 QH
Provides an introduction to modern Africa in the years from 1800 to 1960, showing how a new African civilization arose out of the conflict-ridden conditions imposed on the old. Themes include economic, social, political, religious, and artistic life, as well as the influences of slavery, colonialism, and nationalism. (IV)
- HST 1623/AFR 1403 West African History (Group D)** 4 QH
Surveys the politics and economics of West Africa from the rise of the Mali Empire to the contemporary problems of national development for the countries from Senegal to Nigeria.
- HST 1625/AFR 1405 South African History (Group D)** 4 QH
Presents the historical background to current conflict in the Republic of South Africa and in adjoining Mozambique, Zimbabwe, and Namibia. Examines the rise of the apartheid system—and the opposition and alternatives to it—through the themes of racial conflict, nationalism, and industrialization in this African setting.
- HST 1633 Modern China (Group D)** 4 QH
Explores the far-reaching political, economic, and social changes in China from 1800 to the present. Examines the decline of the empire, the impact of the West, the rise of nationalism, industrialization, the changing role of women, the origins of rural revolution, and establishing the Communist state.
- HST 1634 Contemporary China (Group D)** 4 QH
Examines Chinese polity, society, and economy from 1949 to the present, including the restructuring of urban and rural society in the 1950s, the rise of a new class, the emergence of factionalism, the Cultural Revolution, and the impact of the post-Mao economic and political reforms.
- HST 1637 The Making of Modern Japan: From Samurai to Sony (Group D)** 4 QH
Surveys the evolution of Japan from a third-world nation to a superpower. Major themes include the breakdown of feudalism, the impact of the West, the Meiji Restoration, industrialization, militarism, and Japan's post-World War II modern economic miracle.
- HST 1652 Islam Resurgent (Group D)** 4 QH
Analyzes what has been called "the militant revival of Islam" as a rallying point for reformist or revolutionary movements in the Muslim world. Includes little-known Muslim areas outside the Middle East in Africa and Asia. (VI)

HST 1701 Western Civilization 1 (Honors) Honors equivalent of HST 1101.	4 QH	views with practicing professionals. Requires reading but not fieldwork. Intended as preparation for more specialized courses; required for human services majors but open to other students with appropriate backgrounds.
HST 1702 Western Civilization 2 (Honors) Honors equivalent of HST 1102.	4 QH	
HST 1711 America to 1877 (Honors) Honors equivalent of HST 1201.	4 QH	HS 1324/SOC 1324 Human Services Research and Evaluation 4 QH Covers basic issues in applied research and the evaluation of services, including the purposes of evaluation, ethic formulating questions and measuring answers, designing evaluations and planning oriented research, utilizing evaluation results, and the turbulent setting of action programs. Suitable for students majoring in human services, sociology, psychology, nursing, health education, and related fields. <i>Prereq.</i> SOC 1320 or other statistics, SOC 1240, or permission of instructor.
HST 1712 America since 1877 (Honors) Honors equivalent of HST 1202.	4 QH	
HST 1790 Population in European History (Group A or B) (Honors) Honors equivalent of HST 1390.	4 QH	
HST 1801 Directed Study	4 QH	HS 1333 Senior Seminar in Human Services 4 QH Designed for seniors in human services. Examines emerging roles and career options within the human services field. Study will focus on self-examination of attitudes and values affecting delivery of services, exploration of ethical issues and dilemmas relevant to human services, grantsmanship and funding issues, staff supervision and development within human services agencies, and refinement of group leadership skills.
HST 1805 Approaches to History Requires students to undertake a major historical project based on the application of appropriate methodologies and upon the substantive understanding of a single subject chosen by the course instructor and announced in advance of the quarter. The course is rotated among the department's faculty. Required for all history majors but open to all upperclass students. <i>Prereq.</i> 80 quarter hours of work.	4 QH	
HST 1811, HST 1812, HST 1813, HST 1814 Junior/Senior Honors Program For details contact the honors office.	4 QH each	HS 1336, HS 1337 Human Services Internship 1 6 QH each Human services students are required to fulfill two internship placements during the last two years of their program. Each placement consists of 150 hours on-site and generally varies according to the students' interests. Examples of placement sites include community centers, nursing homes, vocational workshops, state and federal agencies for children, and recreational facilities. Experiences are supervised by University staff to maximize the students' learning opportunities. <i>Prereq.</i> Junior or senior standing and approval by the Human Services Internship coordinator by early in quarter previous to planned quarter of internship.
HST 1821 Fieldwork in History 1 Offers directed work in historical societies, archives, museums, and other historical agencies. Students should consult the department for details. <i>Prereq.</i> HST 1101, HST 1102, HST 1201, HST 1202, and 16 QH in other history courses.	4 QH	

Human Services

HS 1240/SOC 1240 Sociology of Human Service Organizations Introduces selected theoretical perspectives on human service organizations, emphasizing defining organizational goals and effectiveness. Gives students the opportunity to become familiar with the nature of human service organizations; to compare these organizations to business and industrial organizations; to outline specific problems that human service organizations face; and to propose potential solutions.	4 QH
HS 1302/ED 1302 The Human Services Professions Explores what a human service agency is, how it comes into being, and how it grows and changes. Analyzes attitudes, values, skills, and knowledge of the human services worker and the reasons why people in modern society require human services assistance. Views human services from the eyes of clients as well as society as a whole. Requires fieldwork in a human service agency as well as a good deal of independent study. Required for all human services majors; open to other students on space-available basis. <i>Prereq.</i> ED 1100, SOC 1100, or equivalent.	4 QH
HS 1309/ED 1309 Intervention Strategies for the Human Services Introduces the range of skills used in working with clients in the various helping professions such as counseling (individual and group), advocacy, rehabilitation, community organizing, and income maintenance. Utilizes role playing, simulations, and inter-	4 QH

Interdisciplinary Courses

INT 1105 Introduction to International Affairs Introduces the study of international affairs. Uses lectures, guest lecturers, discussions, case studies, films, and readings across disciplines to provide students with a basis for understanding the global village—global issues, international affairs, regional issues, problems, and potentialities. Covers politics, economics, history, society and culture, and the environment. A team-taught, interdisciplinary course offered by political science, economics, history, sociology, and other departments in the College of Arts and Sciences.	4 QH
INT 1133 Americas from an Indigenous Perspective Examines the history, and culture of the Americas (North America, Mexico, Central America, South America, and the Caribbean) from the perspectives of its original inhabitants. Studies the ways in which indigenous peoples have been encoded into history, influences how they are described in popular culture and textbooks, and sets the tone for current issues such as territorial autonomy, political representation, control of native resources, and human rights that are fundamental in their communities. Provides students with an understanding of how indigenous peoples view their past and their own contemporary problems through examining the construction of indigenous history by others and the way it is being reclaimed by indigenous peoples.	4 QH

INT 1150/SOC 1150 Introduction to Women's Studies: Image, Myth, and Reality 4 QH

Surveys the issues and methodologies involved in the interdisciplinary study of women. Examines the political, economic, social, and historical processes that have created both the image and the reality of women in societies. Guest lecturers provide an overview of the diverse disciplinary approaches to the study of women. (II)

INT 1201 An Analysis of American Racism 4 QH

Discusses the cycle by which racism in our institutions helps form our attitudes and the manner in which our attitudes, in turn, shape our institutions. Emphasizes the practical, day-to-day aspects of racism, rather than the theoretical and historical.

INT 1215 Into the Ocean World 4 QH

Focuses on the seas' complexity and the far-reaching consequences of our interactions with them. A comprehensive interdisciplinary introduction to the oceans. Draws on specialists in the sciences, social sciences, humanities, and arts, each with an interest in marine issues and a commitment to bridging the gaps among disciplines. The course themes are as broad as the oceans, but, when appropriate, we focus on Boston Harbor, a first step into the ocean world for those of us in this area. *Prereq.* *Permission of instructor.*

INT 1216 A History of Seafaring 4 QH

Surveys maritime transportation, trade, travel, exploration, and warfare from approximately 3500 B.C. to the end of the wooden boat era in the late nineteenth century. Prior to the widespread application of steam power on land and sea in the nineteenth century, ships were the fastest, safest, and most economical means of transporting large cargoes over long distances. Literary and art history sources are also introduced, along with several films on maritime archaeology. *Prereq.* *Permission of instructor.*

INT 1217 Water: Planning for the Future 4 QH

Explores the ways in which water has affected our bodies, our planet, our history, and our culture, and the danger posed by increasing demand, waste, and pollution on our limited supply of usable fresh water. Considers water through scientific, historical, and cultural viewpoints, and surveys contemporary water problems in all their dimensions—political, economic, and technological. Same as SOC 1150. *Prereq.* *Permission of instructor.* (VI)

INT 1219 Advanced Seminar in Marine Studies 4 QH

Focuses on outstanding issues in the marine environment. Using a seminar format, students from colleges and universities throughout the Boston area convene to address the complex interactions of disciplines, including scientific, legal, economic, and technical aspects of issues, that come into play in marine affairs. Seminars are lead by experts actively involved in the issues.

INT 1220 Coastal Issues Seminar 4 QH

Focuses on outstanding issues in coastal environmental affairs. Discusses scientific, legal, economic, and technical aspects of coastal issues, and integrates them into problem-solving exercises. *Prereq.* *Permission of instructor.*

INT 1302 Female Perspectives on Society 4 QH

Examines social science and interdisciplinary feminist literature that focuses on women in families and at work, and that analyzes issues affecting women's health and safety, including violence against women and abortion. Incorporates the perspectives of

women of color. Considers and evaluates women's views of social life as well as recognizes the difference among women. (VI)

INT 1320 Exploring the Humanities Through Film 4 QH

Investigates the ways in which the methods of the humanities can expand one's awareness of the sources, statements, and meanings of popular films. Presents series of movies for evaluation in the light of readings, the various approaches presented by faculty members from a number of humanistic disciplines, and students' own experience. (II)

INT 1321 Modernism: Art, Film, and Literature 4 QH

Examines the interrelation of film, art, and literature in the major movements of the twentieth century to 1939. Studies Futurism, Cubism, Expressionism, Dada, and Surrealism, featuring European films, art, and literature in a comparatist perspective. Examines the persistence of modernist elements in contemporary art, literature, and film. Research paper or creative project due at the end of the term. Team-taught by members of the art, English, and modern languages departments.

INT 1570 On Understanding Science 4 QH

Develops the quantitative and qualitative skills needed to critically read about science in newspapers and magazines. Examines the historical, philosophical, and social nature of science; units and scientific notation; technological developments of the last two hundred years; sources of information; and current scientific developments.

INT 1580 Physical Chemistry with Biological Applications 4 QH

Examines physiochemical principles as they apply to biological processes. Topics include chemical equilibria, reaction kinetics, basic thermodynamics, oxidation-reduction reactions and bioenergetics, and transport. Emphasizes problem solving as a tool for learning, using a quantitative approach. Explains basic assumptions and limitations underlying principles; for the most part, however, rigorous derivations are avoided. Makes applications to basic experimental techniques in biochemistry by way of relevant biochemical examples. *Prereq.* *BIO 1261.*

INT 1700 War and Conflict in the Nuclear Age (Honors) 4 QH

Honors equivalent of INT 1140. Discusses the development of nuclear weapons. Explores the decisions leading to and the aftermath of the nuclear attack on Hiroshima and Nagasaki. Examines the Cold War and the growth of nuclear arsenals, the potential causes of a nuclear war and the probable effects, and this issue's moral questions. Evaluates strategies for preventing nuclear war. (VI)

INT 1702 War Work: The Experience of World War II (Honors) 4 QH

Examines the Second World War as an example of the impact external events can have on professions. This upperclass course is team-taught by faculty from various disciplines.

INT 1704 Northeastern in the 1960s (Honors) 4 QH

Explores how college life and curricula have changed over the past twenty years by studying the microcosm of Northeastern University. Involves research papers on topics such as curriculum changes, student values as reflected in literature and folklore, and the Northeastern riots in comparative context.

INT 1705 Greek Language and Literature (Honors) 4 QH

Focuses on Attic Greek grammar and selections from Greek literature in the original language. Discussion of texts is major part of course.

INT 1706 Industrial Relations (Honors)**4 QH**

Presents theories and applications of labor management relations through lectures and case discussions. Focuses on the development of American and European labor movements, emphasizing legal and economic factors. Topics include union objectives, organization, and structure; union government and democracy; collective bargaining; and management approaches to industrial relations.

INT 1707/ENG 1550 Psychology and Literature (Honors)**4 QH**

Examines literature from a psychoanalytic perspective. Topics include Freud's theories, object relations, Lacan's theories, and Kohut's self-psychology. Discusses works by Charles Dickens, Franz Kafka, Virginia Woolf, Doris Lessing, and Anne Tyler.

INT 1709 Cultural Passages in the Arts—Boston**4 QH**

Exposes students to the richness of the Boston cultural environment through a directed field study with various Northeastern University faculty. Students will be required to keep a detailed journal and produce a final creative project. Field trips will include various museums, theaters, and some neighborhoods within the city of Boston.

INT 1710 Italy (Honors)**4 QH**

Honors interdisciplinary seminar on the history, art and modern culture of Italy with a primary focus on Pisa and Florence.

INT 1721 Modernism: Art, Film, and Literature (Honors)**4 QH**

Honors equivalent of INT 1321.

Journalism

JRN 1103 Newswriting 1**4 QH**

Covers functions of the editorial department and procedures in obtaining and writing news stories. Offers extensive news writing and an introduction to interviewing. Legal issues defined. Typing skills required. *Prereq.* ENG 1275 with grade of C or better.

JRN 1104 Newswriting 2**4 QH**

Offers practice in multi-source and breaking stories. Provides an introduction to government and court reporting, advanced work in interviewing, and experience in writing under deadline pressure. Discusses legal issues. *Prereq.* JRN 1103 with grade of C or better.

JRN 1206 Editing**4 QH**

Provides practice in copy editing and headline writing. Presents assignments in photo selection, cropping, and outline writing. Introduces page layout. *Prereq.* JRN 1104 with grade of C or better.

JRN 1250 Interpreting the Day's News**4 QH**

Considers the news of the day and the function of the newspaper, news magazine, and news broadcasts in American life. Topics include rights and responsibilities of the press and how news is gathered, processed, and disseminated by the various media. (VI) For nonmajors as well as majors.

JRN 1301 Basic Photojournalism**4 QH**

Covers camera and darkroom procedures along with cropping, assignment techniques, theory, and photo caption methods. *Prereq.* JRN 1104.

JRN 1305 Techniques of Journalism**4 QH**

Provides practice in writing in-depth and multiplesource stories requiring significant research. Provides an introduction to

investigative reporting, practice in feature writing, and a review of legal issues. *Prereq.* JRN 1104.

JRN 1320 Radio News Gathering and Reporting**4 QH**

Covers writing and editing news for radio, with practice in interviewing, organizing news scripts, and integrating audio materials into broadcast. *Prereq.* JRN 1103.

JRN 1336 Public Relations Principles**4 QH**

Presents the principles, history, and methods of public relations, processes of influencing public opinion, responsibilities of the public relations practitioner, and analyses of public relations programs. *Prereq.* Sophomore standing.

JRN 1350 Advertising Principles**4 QH**

Covers the development, procedures, economic functions, and responsibilities of advertising: planning, research, production, and other elements that go into successful advertising. *Prereq.* Upperclass standing.

JRN 1421 Television Newswriting**4 QH**

Covers writing for TV news as opposed to other news media, importance of the writer-reporter as field-producer and writer-producer, and terms and language used in the production of TV news shows. Includes actual individual production of news shows, field trips to TV stations, and guest lecturers from the TV news media. *Prereq.* JRN 1103.

JRN 1422 Television News Production**4 QH**

Demonstrates techniques used by the electronic journalist and TV news producer. Provides the opportunity to build a TV news show and to do reporting with portable TV cameras and editing equipment. *Prereq.* JRN 1103 and JRN 1421.

JRN 1428 The Role of Journalism in Sports**4 QH**

Offers an analysis of the impact of journalism on the institution of sports in this country and around the world. Considers sports reporting as a motivator and demotivator from Little League to college and professional levels. Looks at the effect of news media coverage on violence in organized sports, on America's physical fitness, and on other aspects of society.

JRN 1430 Fundamentals of Sports Reporting**4 QH**

Applies principles of news reporting to covering men's and women's sports for print and broadcast media. Emphasizes using sports reference materials, developing contacts, interviewing, and structuring the sports story. Also discusses investigative reporting in sports. *Prereq.* JRN 1104.

JRN 1432 Local Government Reporting**4 QH**

Discusses coverage of town/city government, with emphasis on the "beat" approach to reporting public affairs. Focuses on practical, in-the-field experience with town meetings, meetings of boards of selectmen, and other commissions and bodies transacting public business. *Prereq.* JRN 1104.

JRN 1440 Design and Graphics**4 QH**

Applies layout and design principles to newspapers, magazines and other print media. Covers type faces, copy measuring, dummyming, photo sizing, and keeping copy flow charts. Applies design and graphics principles to advertising layout. *Prereq.* JRN 1206.

JRN 1451 Advertising Copy Writing**4 QH**

Covers theory and techniques of creating advertising copy for newspapers, magazines, radio, television, and direct mail.

Emphasizes fact gathering, copy structure, and advertising design. *Prereq.* JRN 1103, and JRN 1350.

JRN 1460 Public Relations Problems 4 QH
Applies public relations techniques to actual problems; presents case studies in industry, labor, education, government, social welfare, and trade associations. *Prereq.* JRN 1336.

JRN 1501 History of Journalism 4 QH
Traces the development of American journalism from its European and English beginnings. Topics include the colonial press, the great personal journalists of the nineteenth century, and the impact of major technological changes in mass communications media in the twentieth century. Some writing required. *Prereq.* Upperclass standing.

JRN 1508 Law of the Press 4 QH
Examines legal problems of libel, invasion of privacy, and access to government information; discusses the balance between private rights and the public's "need to know." *Prereq.* Upperclass standing.

JRN 1512 Journalism Ethics and Issues 4 QH
Explores the responsibilities of news media and ethical issues confronting decision-makers in journalism. Examines the principles found in codes of the American Society of Newspaper Editors, the Associated Press Managing Editors, the Society of Professional Journalists, and other organizations. Some writing required.

JRN 1522 Magazine Writing 4 QH
Covers writing and free-lancing magazine articles; analyzing magazines as markets; and selecting the best feature format—how-to-do-it, profile, personal experience, human interest, interpretive pieces, and others. *Prereq.* JRN 1104.

JRN 1540 Sports Public Relations 4 QH
Covers the planning and implementing of public relations functions for professional, amateur, and recreational athletic organizations. Stresses use of journalistic research techniques, implementation of programs, and effective communication with news media and various publics. *Prereq.* JRN 1103, and JRN 1336.

JRN 1552 Advertising Practice 4 QH
Covers the preparation of advertising for print and broadcast media, including campaign planning and space and time buying and scheduling. Includes product research, consumer surveys, and measuring the effects of advertising. *Prereq.* JRN 1451.

JRN 1561 Public Relations Practice 4 QH
Demonstrates practices and techniques employed in the field, including organization of events and functions. Studies campaign planning, research, and media relationships. *Prereq.* JRN 1103 and JRN 1336.

JRN 1575 Publication Production and Management 4 QH
Examines the organizational structure, production methods, and management procedures of print media companies. Analyzes the interaction of business, advertising, production, and circulation departments. *Prereq.* JRN 1206.

JRN 1617 The Constitution and Mass Communications 4 QH
Explores the meaning of freedom of the press through study and discussion of the evolving First-Amendment interpretations of the United States Supreme Court. *Prereq.* Upperclass standing.

JRN 1703 Newswriting 1 (Honors) 4 QH
Honors equivalent of JRN 1103.

JRN 1704 Newswriting 2 (Honors) 4 QH
Honors equivalent of JRN 1104.

JRN 1870, JRN 1880 Seminar 4 QH
Offers discussions and readings on topics of current significance in various journalistic fields. *Prereq.* Upperclass standing.

JRN 1890, JRN 1891 Directed Study in Journalism 4 QH each
Prereq. Permission of instructor.

JRN 1892 Topics 4 QH
Prereq. Permission of instructor.

JRN 1894, JRN 1895, JRN 1896, JRN 1897 4 QH each
Junior/Senior Honors Project
For details contact the honors office.

Linguistics

LIN 1118/ENG 1118 Introduction to Language and Linguistics 1 4 QH
Introduces students to their unconscious linguistic knowledge about sentence structure (syntax), meaning (semantics), word forms (morphology), and speech sounds (phonology). Examines other issues related to language such as the Black English/Standard English debate, women's and men's language, "talking" chimpanzees, "talking" computers, and the nature/nurture controversy. (II)

LIN 1119/ENG 1119 History of the English Language 4 QH
Studies the development of modern English from Anglo-Saxon beginnings; effects of Scandinavian and Norman invasions; dialect geography; evolutionary changes, word formation, and borrowing; and origins of writing and problems of spelling. Readings include both formal and informal writings, literary selections, wills/journals, and private and public letters. (III)

LIN 1215/PHL 1215 Symbolic Logic 4 QH
Focuses on the syntax and semantics of propositional logic and first order quantification theory. Considers relations between these systems and natural language. Covers analysis of the notion of derivation within a system, the notion of logical consequence, and practice in analyzing logical structure in natural language sentences. (II)

LIN 1218/ENG 1218 Introduction to Language and Linguistics 2 4 QH
Focuses on four core areas in the study of language: syntax, morphology, phonology, and semantics. Examines the intricacies and systematicities that underlie the linguistics system inside each language user's mind, with a slant toward "doing" linguistics: working with data, analyzing it, and ultimately explaining it. *Prereq.* LIN 1118/ENG 1118 or permission of instructor.

LIN 1220/LNL 1220 Introduction to Phonetics and Phonology 4 QH
Explores the acoustic and articulatory basis of phonology. Emphasizes hands-on experience with standard areas in modern phonology, including phonetics, phonetic variation, natural classes of sounds, phoneme alternations, rule systems, and prosodic phonology. Introduces major contemporary theories including autosegmental phonology and feature geometry.

LIN 1231/AFR 1231 African-American English**4 QH**

Addresses topics in the study of African-American English. Investigates the hypotheses about the origins of African-American English as well as arguments about the relation of the dialect to English and other languages. Considers issues regarding the use of the dialect in the educational context.

LIN 1235/LNL 1235 Applied Linguistics**4 QH**

Explores the solution of language-based real-world problems. Solutions to these problems depend on information not only from linguistics but also from a variety of other disciplines such as anthropology, sociology, education, ethnic and area studies (including literature), and public administration. Studies the relationship of linguistics to applied linguistics; second language acquisition; second and foreign language teaching; language policy and planning; and the linguistic aspects of multiculturalism.

LIN 1240/LNL 1240 Bilingualism**4 QH**

Focuses on the fact that half of the world's population is bilingual, that is, uses two or more languages on a regular basis. Also explores the fact that bilingualism remains a poorly understood phenomenon surrounded by a number of myths: those that hold that bilinguals are found in bilingual countries and are equally fluent in their languages; that bilingual children suffer from cognitive impoverishment; and that bilingual education hinders the assimilation of minority groups. Reviews all aspects of bilingualism (in the world, in society, in the child, and in the adult). Discusses topics such as biculturalism and language change.

LIN 1245/LNF 1250 History of the French Language**4 QH**

Examines the development and emergence of the French language from its earliest literary manifestations. Offers the opportunity to become familiar with the language's earlier stages. Emphasizes developing a working knowledge of medieval French. Includes the relationship of Old French to Latin, structural characteristics of Old French, and the impact of historical events on language. Compares different stages of French. Conducted in English. *Prereq.* Reading knowledge of French or permission of instructor.

LIN 1250/ASL 1250 Linguistics of American Sign Language**4 QH**

Introduces the basic issues of linguistics by examining the structural properties of American Sign Language and comparing it with other languages having similar properties. Includes phonology (formational properties of signs), morphology (word formation rules, derivation and inflection, complex verbs, classifiers, verb modulations), semantics (the meaning structure of signs), and syntax (the structure of ASL utterances in terms of old versus new information and the structure of ASL narratives). *Prereq.* ENG 1118 and the ability to follow lectures in ASL.

LIN 1255/LNS 1250 History of the Spanish Language**4 QH**

Examines the development and emergence of the Spanish language. Offers the opportunity to become familiar with the language's earlier stages. Emphasizes developing a working knowledge of medieval Spanish. Includes the relationship of Old Spanish to Latin, structural characteristics of Old Spanish, and the impact of historical events on language. Compares different stages of Spanish. Conducted in English; however, the textbook is in Spanish. *Prereq.* Reading knowledge of Spanish or permission of instructor.

LIN 1260/LNL 1260 Introduction to Romance Linguistics**4 QH**

Provides a general linguistic introduction to one of the most important language families. Discusses the structural characteris-

tics of several Romance languages. Includes defining a language family, how and why languages change, and the relationship of standard and nonstandard linguistic varieties. Studies contemporary theoretical issues in Romance linguistics including object pronoun placement, word order, creolization, and subject pronoun use. Conducted in English. *Prereq.* Reading knowledge of one Romance language or permission of instructor.

LIN 1262/PSY 1262 Psychology of Language**4 QH**

Provides a basic introduction to psycholinguistics. Topics include the nature and structure of languages, processes involved in the production and comprehension of language, the biological bases of language, and aspects of language acquisition. Examines current theories of language processing and related experimental findings. *Prereq.* PSY 1112 or PSY 1113.

LIN 1263/PSY 1263 Nonverbal Communication**4 QH**

Examines the messages we send by posture, facial expression, gesture, gait, and interpersonal distance. Also explores how power, status, and gender affect nonverbal communication. *Prereq.* PSY 1112 or PSY 1113.

LIN 1335/SOA 1335 Language and Culture**4 QH**

Focuses on the anthropological study of linguistics. Presents basic theories of sociolinguistics and explores language in its social context. Includes animal communication; language learning; language and mind; cognitive and symbolic anthropology; the ethnography of speaking, speech, and boundaries; multilingualism; language and gender; language and ethnicity; language and social class; and pidgins and creoles. Includes several field assignments.

LIN 1362/PSY 1362 Child Language**4 QH**

Examines how language develops in children. *Prereq.* PSY 1262, linguistics, or permission of instructor.

LIN 1364/PSY 1364 Cognition**4 QH**

Provides a basic introduction to human cognition. Topics include pattern recognition, attention, memory, categorization and concept formation, problem solving, and aspects of cognitive development. Examines current theories of cognitive processing and related experimental findings. *Prereq.* PSY 1112 or PSY 1113.

LIN 1365/PSY 1365 Language and the Brain**4 QH**

Focuses on linguistic behavior from a neuro-psychological viewpoint. Examines models of how the nervous system, the brain in particular, controls the production, perception, and internal manipulation of language. Considers localization of cerebral functions and hemispheric lateralization; experimental and clinical evidence for functional models; aphasia and other language pathologies; schizophrenic language; evidence from "slips of the tongue"; and the bilingual brain. Compares speech, sign language, and writing systems. Also discusses interpretation and translation. *Prereq.* PSY 1262 or permission of instructor.

LIN 1401/ENG 1401 Introduction to Syntax**4 QH**

Offers an introduction to the mental rules that speakers of any language follow when they combine words into meaningful sentences and when they decode the strings of sounds that they hear every day. Explores the mental machinery that every language-user unconsciously employs. Examines sentence structure, syntactic principles, universal grammar, and innateness in a generative framework. (V)

LIN 1407/ENG 1407 Introduction to Semantics 4 QH

Focuses on meaning and how it is expressed in language through words, sentence structure, intonation, stress patterns, and speech acts. How do content, logic, and speakers' and listeners' assumptions affect what sentences can mean? In what way is linguistic meaning determined by our perceptual system or our culture?

LIN 1408/ENG 1408 Topics in Linguistics 4 QH

Examines closely one of a range of topics from the perspective of current linguistics: American dialects, language and law, women's and men's language, words and word structures, or issues in linguistics and literature.

LIN 1415/AFR 1415 African Language 4 QH

Seeks to prepare students for serious theoretical and practical study of the West African language and literature known as Kwa, the largest language subgroup in the Niger-Congo family. Students will explore the classification of African languages, the application of basic linguistics, and the history of these languages in Africa and the Western hemisphere, all leading to an introduction to spoken Yoruba and Igbo.

LIN 1440/PHL 1440 Philosophy of Language 4 QH

Examines prospects for a theory of language, its syntax, and its semantics. Examines contrasts between theory of reference and theory of meaning. Asks whether there are universals of language. Analyzes relations between linguistics and psychology. Includes readings from Frege, Quoin, Russell, Chomsky, and Fodor. *Prereq.* *Permission of instructor.*

LIN 1562/PSY 1562 Psycholinguistics Laboratory 4 QH

Provides students the opportunity to acquire first-hand experience in conducting research on issues in the psychology of language. Focuses on classical experiments and their implications for broader issues of language processing. Involves students in all aspects of each experiment, including collecting and analyzing data and preparing lab reports. *Prereq.* *PSY 1212 and PSY 1261 or PSY 1364.*

LIN 1564/PSY 1564 Cognition Laboratory 4 QH

Provides students the opportunity to acquire first-hand experience in conducting research on issues in human cognition. Focuses on classical experiments and their implications for broader issues of cognitive functioning. Involves students in all aspects of each experiment, including collecting and analyzing data and preparing lab reports. *Prereq.* *PSY 1212 and PSY 1354 or PSY 1262.*

LIN 1661/PSY 1661 Seminar in Psycholinguistics 4 QH

Offers intensive study and discussion of issues in the psychology of language. Specific topics vary by quarter. *Prereq.* *PSY 1212 and PSY 1262 or PSY 1364.*

LIN 1662/PSY 1662 Seminar in Cognition 4 QH

Offers intensive study and discussion of issues in cognitive psychology. Specific topics vary by quarter. *Prereq.* *PSY 1212 and PSY 1262 or PSY 1364.*

LIN 1692 Seminar in Linguistics 4 QH

Specific topics vary by quarter.

LIN 1693 Seminar in Linguistics 4 QH

Specific topics vary by quarter.

LIN 1801 Directed Study 1 QH

Offers independent work on a chosen topic under the direction of a faculty member. *Prereq.* *Permission of instructor.*

LIN 1802 Directed Study 2 QH

Offers independent work on a chosen topic under the direction of a faculty member. *Prereq.* *Permission of instructor.*

LIN 1803 Directed Study 3 QH

Offers independent work on a chosen topic under the direction of a faculty member. *Prereq.* *Permission of instructor.*

LIN 1804 Directed Study 4 QH

Offers independent work on a chosen topic under the direction of a faculty member. *Prereq.* *Permission of instructor.*

Mathematics

MTH 1000 Mathematics Preliminaries 1 4 QH

Supplies, together with MTH 1010, the high school math background necessary for a student to enroll in MTH 1101, MTH 1106, or MTH 1113. Includes the arithmetic of signed numbers, fractions, decimals, and percents; operations on polynomials; solving simple first degree equations; and laws of exponents. *Prereq.* *Permission of course coordinator.*

MTH 1010 Mathematics Preliminaries 2 4 QH

Supplies, together with MTH 1000, the high school math background necessary for a student to enroll in MTH 1101, MTH 1106, or MTH 1113. Includes solving first and second degree equations and systems of equations; graphic lines and parabolas; solving equations with algebraic fractions; solving word problem applications. *Prereq.* *Permission of course coordinator.*

MTH 1101 Applications of Algebra 4 QH

Examines linear equations and their graphs, and systems of linear equations and linear inequalities in two variables, with application to linear programming. Introduces matrices with application to Markov chains; set theory, techniques of counting; permutations and combinations and elementary probability. (I)

MTH 1103 Basic Probability 4 QH

Covers introduction to probability, sample spaces with equiprobable events, permutations and combinations, conditional probability. Also discusses random variables, introduction to Markov processes. *Equiv.* to MTH 1150.

MTH 1106 Functions and Algebra 4 QH

Examines how to solve various kinds of algebraic equations: linear, quadratic, and linear systems in two and three unknowns. Considers applications to word problems such as motion, mixture, and variational problems. Covers the concept of function, graphs, line slopes, and graphs of polynomials. Also discusses some elementary trigonometry and vectors in the plane. Students do not receive credit for this course if they have already received credit for MTH 1188 or MTH 1191.

MTH 1107 Functions and Basic Calculus 4 QH

Introduces differential calculus. Examines elementary rules of differentiation with application to graph sketching and to maximum and minimum problems. Discusses exponential and logarithmic functions with applications to compound interest, population

growth, and radioactive decay. (I) Students do not receive credit for MTH 1107 if they have already received credit for MTH 1114.

MTH 1108 Basic Calculus 2 **4 QH**

Offers a review and continuation of differential calculus, graphing and differentiation of trigonometric functions; also presents an introduction to integral calculus with applications to geometric problems and differential equations.

MTH 1113 College Mathematics for Business and Economics **4 QH**

Focuses on sets, rectangular coordinates and graphs, functions and functional notation; linear, exponential, and logarithmic functions. Studies permutations and combination, elementary probability concepts, and simple and compound interest annuities.

MTH 1114 Calculus for Business and Economics **4 QH**

Studies functions, derivatives, differential of polynomials, exponential functions and logarithmic functions; graphics functions using maximum, minimum, inflection points; and optimization in nonlinear problems; marginal analysis of cost, revenue, profit functions. Emphasizes work problems and applications. *Prereq.* MTH 1113 or equivalent. *Students do not receive credit for MTH 1114 if they have already received credit for MTH 1107.*

MTH 1120, MTH 1121 Intensive Calculus 1 and 2 **6 QH each**

Assists students in overcoming deficiencies in precalculus mathematics without losing ground in the MTH 1123 sequence. Reviews high school algebra, introduces trigonometric functions, and covers the material in MTH 1123 and MTH 1124. Includes lecture and homework review sessions. (Students placed in this course by request or on the basis of their College Board scores and the results of an orientation-week diagnostic test.)

MTH 1123 Calculus for Engineering Majors 1 **4 QH**

Introduces the differential calculus of one variable, including trigonometric, exponential, and logarithmic functions, together with their graphs. Includes average rates of change, instantaneous rates of change, derivatives, and the chain rule. Covers curve sketching, applications of the derivative to problems involving related rates, and maxima and minima.

MTH 1124 Calculus for Engineering Majors 2 **4 QH**

Introduces integral calculus including areas, volumes, and other applications. Studies integration involving trigonometric, inverse trigonometric, exponential, and logarithmic functions. Introduces differential equations. *Prereq.* MTH 1123.

MTH 1125 Calculus for Engineering Majors 3 **4 QH**

Studies the calculus of elementary functions in the context of complex numbers. Includes infinite series as well as second order differential equations. *Prereq.* MTH 1124.

MTH 1133 Calculus for Biology Majors 1 **4 QH**

Begins with the fundamentals of differential calculus and proceeds to specific problems encountered in biological research. Studies the formulation of physiological problems in terms of differential equations; solutions of differential equations by method of undetermined coefficients; and application to compartmental problems.

MTH 1134 Calculus for Biology Majors 2 **4 QH**

Studies integral calculus; trigonometric functions; solutions of differential equations by separation of variables; and advanced compartmental problems. Introduces pharmacokinetics, numerical integration, and Euler's method. *Prereq.* MTH 1133.

MTH 1135 Calculus for Biology Majors 3 **4 QH**

Presents functions of several variables, Taylor polynomials, and infinite series. *Prereq.* MTH 1134.

MTH 1137 Discrete Mathematics 1 **4 QH**

Covers binary arithmetic, basic set theory, functions and induction; studies permutations, combinations, Euclidean algorithm and congruence; introduces graph theory and recurrence relations. *Prereq.* MTH 1123.

MTH 1140 Calculus for Science Majors 1 **4 QH**

Presents introductory calculus primarily for mathematics, physics, and chemistry majors. Together with MTH 1141 and MTH 1142, includes derivatives and integrals of one-variable functions; applications to curve sketching, maxima and minima problems, area, moments, simple volumes, etc.; approximation methods, including numerical integration, root finding, Taylor series, and power series; introduces differential equations. Requires students to master the use of the computer to make value tables and plot curves and to implement simple numerical algorithms.

MTH 1141 Calculus for Science Majors 2 **4 QH**

Continues MTH 1140. *Prereq.* MTH 1140.

MTH 1142 Calculus for Science Majors 3 **4 QH**

Continues MTH 1141. *Prereq.* MTH 1141.

MTH 1150 Probability, Statistics, and the Computer **4 QH**

Presents a computer-oriented introduction to statistical methods, with applications in the social and life sciences. Examines descriptive statistics, elementary probability, correlation and regression, and the fundamentals of statistical inference (confidence intervals and hypothesis testing) with a minimum of mathematical derivations. Uses a statistical computer package such as MINITAB or SPSS to solve supplementary problems. Equivalent to MTH 1103. *Prereq.* Nonmath majors.

MTH 1152 Statistical Thinking **4 QH**

Introduces the statistical style of thinking for students without mathematical sophistication or who ordinarily don't like mathematics. Assigns readings from a wide variety of sources. Uses extensive class discussion and homework problems to teach students to use statistics and to critically evaluate the use of statistics by others. Covers descriptive statistics, statistical tests, confidence intervals, regression, and sampling. (II) *Economics majors do not receive credit for this course if they have already earned credit for ECN 1250 or MSC 1201.*

MTH 1183 Mainstreams of Mathematics **4 QH**

Traces the development of some key mathematical ideas, their historical context, and current applications. May include mathematical games and puzzles; number systems past and present; logic and computers; calculus and the rise of modern science, art, and symmetry; and cut-and-paste topology. Assumes no more than high school algebra and geometry. Encourages students with diverse backgrounds to rediscover mathematics through individual projects, supplemental readings, and classroom discussions.

MTH 1188 Problem Solving and Pre-Calculus 1 **6 QH**

Develops basic algebraic and problem-solving skills in students who indicate these needs and are enrolled in this course rather than the four-credit MTH 1191. Together with MTH 1189, prepares the student for calculus (MTH 1193). Includes writing equations and relating word problems to equations, plotting linear equations,

word problems involving algebraic fractions, algebraic operations, radicals, inequalities, functional notation and the graphing of functions. The TI-85 graphics calculator is required for this course. *Students who earn credit for this course may not receive credit for MTH 1106 or MTH 1191.*

MTH 1189 Problem Solving and Pre-Calculus 2 6 QH
Continues MTH 1188. Includes functions and graphing, composite functions and inverse functions, logarithmic and exponential functions and equations, trigonometric functions and their graphs, solving trigonometric problems, trigonometric identities, and vectors in two-dimensions. The TI-85 graphics calculator is required for this course. Equivalent to MTH 1192.

MTH 1191 College Algebra 4 QH
Focuses on fundamental algebraic operations, complex numbers, radicals and exponents, functions, linear and quadratic equations, irrational equations, inequalities, variation, and roots of polynomial equations. The TI-85 graphics calculator is required for this course. *Prereq. BSET majors only. Students who earn credit for this course may not receive credit for MTH 1106 or MTH 1188.*

MTH 1192 Pre-Calculus 4 QH
Focuses on logarithms, trigonometric functions of angles in degrees and radians, trigonometric identities and equations, right triangles, oblique triangles, complex numbers in trigonometric form, systems of equations, and determinants. The TI-85 graphics calculator is required for this course. Equivalent to MTH 1189. *Prereq. MTH 1191 or MTH 4107; BSET majors only.*

MTH 1193 Calculus 1 4 QH
Focuses on plane analytic geometry; differentiation of algebraic functions; rate, motion, maximum and minimum problems; derivatives of higher order; curve sketching; basics in functions, limits, and continuity. (Not equivalent to MTH 1123.) *Prereq. MTH 1192 or MTH 4108; BSET majors only.*

MTH 1194 Calculus 2 4 QH
Focuses on applications of derivatives to curve sketching; anti-differentiation; the definite integral, with applications; calculus of nonalgebraic functions — logarithmic, exponential, and trigonometric; calculus of inverse trigonometric functions; techniques of integration; indeterminate forms; and L'Hopital's rule. (Not equivalent to MTH 1124.) *Prereq. MTH 1193 or MTH 4120; BSET majors only.*

MTH 1195 Calculus 3 4 QH
Focuses on polar coordinates, vectors in a plane, calculus of functions of several variables, partial differentiation, multiple integrals, infinite series, vector analysis, and introduction to differential equations. (Not equivalent to MTH 1125.) *Prereq. MTH 1194 or MTH 4121; BSET majors only.*

MTH 1203 History of Mathematics 4 QH
Traces the development of the various branches of mathematics from ancient times to the present, with emphasis on the mathematics itself as well as the mathematicians and cultures that produced it. Teaches students to compute in other number systems, to perform geometric constructions, and to learn proofs of some significant theorems. (III) *Prereq. Interest in history and mathematics.*

MTH 1212 Linear Programming 4 QH
Presents an introduction to concepts and techniques of linear programming, game theory, discrete modeling (shortest path, minimum spanning tree). Explores application to economics, social sciences, and other related fields. (II) *Prereq. One year of college mathematics.*

MTH 1223 Calculus for Engineering Majors 4 4 QH
Covers partial derivatives and multiple integrals, with applications. *Prereq. MTH 1125.*

MTH 1225 Differential Equations (Engineering) 1 4 QH
Offers a study of ordinary differential equations for engineering students. *Prereq. MTH 1223 or equivalent.*

MTH 1226 Differential Equations (Engineering) 2 4 QH
Focuses on numerical methods for solving ordinary differential equations, Fourier series, and selected partial differential equations by separation of variables. Intended primarily for engineering students. *Prereq. MTH 1225.*

MTH 1230 Linear Algebra for Engineers 4 QH
Introduces matrices through Gaussian elimination. Proceeds to vector spaces and linear equations; orthogonality; eigenvalues and eigenvectors. Emphasizes engineering applications such as systems of ordinary differential equations. *Prereq. MTH 1225.*

MTH 1237 Discrete Mathematics 2 4 QH
Covers elements of number theory with an application to public key codes, and elements of group theory with an application to error-detecting and error-correcting codes. *Prereq. MTH 1137.*

MTH 1238 Combinatorial Mathematics 4 QH
Introduces techniques of mathematical proofs, including mathematical induction. Explores various techniques for counting such as permutation and combinations, inclusion-exclusion, Polya enumeration, and the mathematical formulations necessary for these techniques, including elementary group theory and equivalence relations. *Prereq. Two courses in calculus.*

MTH 1240 Chaos and Fractals 4 QH
Presents an experimental study, using simple mathematical models, of chaotic behavior in dynamical systems found in mathematics, science, and computer science. Goals include the development of experimental skills, integration of visual and analytical modes of thought, and an appreciation of issues of problem formulation and representation. *Prereq. MTH 1125, MTH 1137, and COM 1201 or equivalent.*

MTH 1243 Calculus for Science Majors 4 4 QH
Focuses on methods of calculus and vector analysis to study curves, surfaces, and functions of several variables. Studies parameterization of lines and planes, tangents and normal vectors, partial derivatives, maxima and minima problems, linear approximations, and tangent planes. Some linear algebra. *Prereq. MTH 1142.*

MTH 1244 Calculus for Science Majors 5 4 QH
Continues MTH 1243. Covers multiple integration, line integrals, and exact differentials; various forms of Stoke's theorem; and more linear algebra. *Prereq. MTH 1243.*

- MTH 1245 Differential Equations (Science) 1** 4 QH
Focuses on ordinary differential equations and examines first and higher (mostly second) order linear differential equations and systems of equations. Introduces some linear algebra, and also studies eigenvalues and eigenvectors and numerical solution techniques. Applications are treated throughout. *Prereq.* MTH 1143–1145 or equivalent.
- MTH 1246 Differential Equations (Science) 2** 4 QH
Studies the second-order linear ordinary and partial differential equations arising in mechanical vibrations, heat flow and string vibrations. Techniques include Fourier series, eigenfunction expansions, and numerical methods. Stresses analytic solution techniques and their physical applications. *Prereq.* MTH 1245.
- MTH 1301 Linear Algebra 1** 4 QH
Focuses on vectors and vector spaces, including function spaces, subspaces. Examines lengths, angles, scalar products; volumes, determinants; linear independence and dependence, dimension, linear and affine maps, kernel and image. Studies algorithms: row operations, double triangular form, inversion. Introduces linear maps. Gives particular attention to characteristic polynomials, eigenvalues, and eigenvectors in low dimensions. *Prereq.* MTH 1244 or equivalent.
- MTH 1302 Linear Algebra 2** 4 QH
Focuses on detailed study of linear maps. Studies symmetric maps and quadratic forms, isometries, skew-symmetric maps; decomposition of general linear maps using symmetric maps and isometries. Covers polynomials evaluated on linear maps, generalized eigenspaces, Jordan form. As time permits, introduces computational methods, with emphasis both on geometry underlying algorithms and on practical advantages and limitations. Surveys related areas in mathematics in which linear ideas play a role. *Prereq.* MTH 1301.
- MTH 1311 Real Analysis 1** 4 QH
Provides the theory and technique for a rigorous treatment of calculus. Topics vary and may include the construction of the real numbers, continuity and convergence, differentiation and integration, and proofs of selected results such as the inverse and implicit function theorems. Emphasizes careful proofs throughout. *Prereq.* MTH 1137 or permission of instructor.
- MTH 1312 Real Analysis 2** 4 QH
Continues MTH 1311. Focuses on calculus, applying the concepts introduced in MTH 1311. *Prereq.* MTH 1311.
- MTH 1321 Introduction to Groups and Their Applications** 4 QH
Presents examples of groups (symmetry groups, permutation groups, matrix groups, cyclic groups) and their subgroups. Studies finite groups and orders of subgroups; homomorphisms and normal subgroups. Also considers applications to some of the following, depending on time and interest: geometry, number theory, crystallography, physics, and combinatorics.
- MTH 1322 Topics in Rings, Fields, and Number Theory** 4 QH
Introduces commutative rings, ideals, integral domains, fields, and Galois theory. Studies extension fields, Gaussian integers, and other topics as time permits. *Prereq.* MTH 1321.
- MTH 1330 Number Theory** 4 QH
Introduces the elementary methods of analytic number theory. Focuses on divisibility, congruences, arithmetical and multiplicative functions, quadratic reciprocity, and equivalent formulations of the prime number theorem. *Prereq.* MTH 1301 or permission of instructor.
- MTH 1337 Foundations of Mathematics 1** 4 QH
Studies the following topics and the shifts in perspective that their development brought about: disputes over the basis for calculus, twentieth-century discoveries in mathematical logic, and the advent of the computer. (V)
- MTH 1338 Foundations of Mathematics 2** 4 QH
Includes set theory, rules for set formation, the axiom of choice and its role in mathematics, transfinite cardinal and ordinal numbers and arithmetic, and axiomatizations of set theory.
- MTH 1347 Applied Analysis** 4 QH
Demonstrates the application of mathematics to interesting physical and biological problems. Examines methods chosen from ordinary and partial differential equations, calculus of variations, Laplace transforms, singular perturbations, special functions, dimensional analysis, and other techniques of applied mathematics. *Prereq.* MTH 1246 or permission of instructor.
- MTH 1349 Numerical Analysis** 4 QH
In practice, computations are never exact. Therefore, the problem of finding efficient methods to calculate sufficiently accurate answers is of fundamental importance. The emphasis of the course is not on recipes for solving problems, proving theorems, or on writing computer programs. Rather, the practical concerns of efficiency and accuracy are illustrated by studying the following problems: roots of a nonlinear equation, simultaneous linear equations, interpolation, and curve-fitting. *Prereq.* Two years of calculus and one course in programming.
- MTH 1350 Numerical Analysis** 4 QH
Analyzes problems in differential equations, integration, and ordinary differential equations. (Does not require prior knowledge of differential equations; MTH 1349 is not a prerequisite.) Emphasis is similar to that of MTH 1349. *Prereq.* Two years of calculus and one course in programming.
- MTH 1351 Functions of a Complex Variable 1** 4 QH
Focuses on algebra and geometry of complex numbers; concepts of limit, continuity, and derivative in the complex domain; holomorphic functions, series, contour integration; and applications. *Prereq.* MTH 1243 or equivalent.
- MTH 1352 Functions of a Complex Variable 2** 4 QH
Continues MTH 1351. May include conformal mapping, analytic continuation, Riemann surfaces, the Laplace transform and inverse transform, elliptic functions, and applications. *Prereq.* MTH 1351.
- MTH 1367 Geometry** 4 QH
Studies classical Euclidean geometry and symmetry groups of geometric figures by an analytic approach. Teaches how to formulate mathematical propositions precisely and how to construct and understand mathematical proofs. Provides a line between classical and modern geometry with the aim of preparing students for further study in group theory and differential geometry. *Prereq.* Basic linear algebra or permission of instructor.

MTH 1370 Recent Ideas in Geometry 4 QH

Presents some non-Euclidean geometry, especially hyperbolic and elliptic geometries. Topics include algebraic curves and surfaces. *Prereq.* MTH 1367 or permission of instructor.

MTH 1384 Probability for Engineering 4 QH

Discusses sample spaces; axioms of probability; random variables and their distributions; expectation, moments, and characteristic function; bivariate distributions; jointly Gaussian random variables; stochastic processes, including autocorrelation function and power spectral density; and estimation of the mean and autocorrelation function in the presence of noise. *Prereq.* MTH 1223 and MTH 1225 or equivalent.

MTH 1387 Probability 1 4 QH

Focuses on probability functions for finite and infinite spaces; conditional probability and independence; discrete and continuous probability distributions for one or more random variables; expectation; moments; binomial, Poisson, and normal distributions; Law of Large Numbers; and central limit theorem. *Prereq.* MTH 1223 or MTH 1244.

MTH 1388 Probability 2 4 QH

Studies selected topics, including introduction to stochastic processes, with emphasis on Markov chains or random walk. *Prereq.* MTH 1384 or MTH 1387.

MTH 1390 Mathematical Statistics 4 QH

Focuses on estimation of parameters, confidence intervals, hypothesis testing, regression, sampling distributions. *Prereq.* MTH 1384 or MTH 1387.

MTH 1714, MTH 1723, MTH 1724, MTH 1725, MTH 1726, MTH 1733, MTH 1734, MTH 1735, MTH 1740, MTH 1741, MTH 1742, Honors Program 4 QH each

Special sections for honors students of courses MTH 1114, MTH 1123, MTH 1124, MTH 1125, MTH 1223, MTH 1133, MTH 1134, MTH 1135, MTH 1140, MTH 1141, and MTH 1142 respectively.

MTH 1763 Introduction to Computers (Honors) 4 QH

Honors equivalent of MTH 1163.

MTH 1801, MTH 1802, MTH 1803, MTH 1804, MTH 1805, MTH 1806, MTH 1807, MTH 1808 Directed Study 4 QH

Gives highly motivated students the opportunity to explore mathematical situations and theories in depth. Can be used as an opportunity to examine familiar material in fresh ways or to explore new material not offered in formal courses. Provides students strong in mathematics and the related sciences a chance to develop the art and skill needed to work independently and creatively in mathematics. *Prereq.* Permission of instructor. *Students strong in mathematics are permitted to enroll in graduate mathematics courses.*

MTH 1809 Directed Study: Problem Solving 4 QH

Emphasizes mathematical problem-solving techniques from a range of areas, including but not limited to integration, differentiation, number theory, group theory, field theory, combinatorics, linear algebra, differential equations, and mathematical modeling. The mathematical model aspect constitutes one third to one half of the course. Analyzes specific realworld models in complete detail, including running and analyzing computer simulations. Requires students to make a number of presentations to the class demonstrating specific techniques. *Prereq.* Permission of instructor.

MTH 1810 Directed Study 1 QH

Same description as MTH 1801 to MTH 1808. Offered for less intensive projects. *Prereq.* Permission of instructor.

MTH 1811 Directed Study 2 QH

Same description as MTH 1801 to MTH 1808. Offered for less intensive projects. *Prereq.* Permission of instructor.

MTH 1825, MTH 1826, MTH 1827, MTH 1828 Junior/Senior Honors Project 4 QH each

For details contact the honors office.

Modern Languages

Prerequisites listed for modern languages are based on current course numbers at Northeastern. If approved by the Department of Modern Languages and the dean's office, equivalent course work acquired elsewhere may be considered acceptable to satisfy these prerequisites. The following courses are offered in English, and no knowledge of a foreign language is required to take them: LNF 1510, LNF 1511, LNF 1512, LNF 1513, LNI 1510, LNI 1511, LNI 1512, LNR 1500, LNR 1510, LNR 1511, LNS 1500, LNS 1501, and LNS 1510. Locate these courses under the appropriate heading for course descriptions. Language majors interested in obtaining major credit for any of these courses should consult their instructor.

Cinema

The following cinema courses are offered by the Department of Modern Languages. For more information on the cinema studies minor and a listing of all cinema studies courses see page 32. These courses are conducted in English and no knowledge of a foreign language is required to take them. Locate these courses under the appropriate heading for course descriptions. Language majors interested in obtaining major credit for any of these courses should consult their instructor.

LNF 1521 French Film and Culture
LNF 1550 Introductory Film Analysis
LNF 1551 Film Theory
LNF 1560 Film and Psychoanalysis
LNG 1554 Modern German Film and Literature
LNS 1550 Spanish Civil War in Spanish Film

Linguistics

The following linguistics courses are offered by the Department of Modern Languages. For more information on the linguistics major or minor and a listing of all linguistics courses see page 54. These courses are conducted in English and no knowledge of a foreign language is required to take them. Locate these courses under the appropriate heading for course descriptions. Language majors interested in obtaining major credit for any of these courses should consult their instructor.

LNF 1250 History of the French Language
LNL 1235 Applied Linguistics
LNL 1260 Introduction to Romance Linguistics
LNS 1250 History of the Spanish Language

Literature and Culture (taught in English)

The following courses are conducted in English and no knowledge of a foreign language is required to take them. Locate these courses under the appropriate heading for course descriptions. Language majors interested in obtaining major credit for any of these courses should consult their instructor.

LNF 1510 Modern Philosophical French Literature in Translation

LNF 1512 Introduction to Literature

LNI 1510 The Works of Dante in Translation 1

LNI 1511 The Works of Dante in Translation 2

LNI 1512 Italian Seminar: Pirandello

LNR 1500 Backgrounds in Russian Culture

LNR 1510 The Works of Alexander Pushkin in Translation

LNR 1511 Russian Literature in Translation

LNS 1500 Backgrounds in Hispanic Culture

LNS 1501 Backgrounds of Latin American Culture

LNS 1506 Cervantes and His Times

LNS 1510 Saints and Sinners: The Vision of Women in the Middle Ages and the Renaissance

LNS 1511 Introduction to Caribbean Literature

LNS 1512 The Don Juan Figure in Literature

French

LNF 1101 Elementary French 1

4 QH

Designed for students with very little or no prior knowledge of French, this course provides a lively introduction to basic oral expression, listening comprehension, and elementary reading and writing. The audiolingual approach, using practical vocabulary drawn from realistic situations, aims at good pronunciation and ease in response. Each lesson incorporates helpful information about daily life in France and the varied cultures within the world of French speakers. Laboratory practice complements classwork, enables students to work aloud at their own speed, reinforces their acquisition of essential structures, and acquaints them with a vast library of audiovisual resources.

LNF 1102 Elementary French 2

4 QH

Continues beginners' exposure to the "four skills"—oral comprehension, speaking, reading, and writing French—so that the linguistic tools needed to understand and function in foreign contexts—at home, abroad, and in the world of literature and film—may be acquired. *Prereq.* LNF 1101.

LNF 1103 Intermediate French 1

4 QH

Designed for students who wish to further their audiolingual skills and improve their reading and writing; combines a review and continued study of grammar essentials with oral, writing, and language lab practice. Varied readings include journalistic, cultural, and modern literary texts. Conducted primarily in French so that students may exercise their new skills. *Prereq.* LNF 1102 or equivalent.

LNF 1104 Intermediate French 2

4 QH

Uses the fundamentals of French to promote effective self-expression through speaking and writing and to explore the idiomatic aspects of the language. Through progressive class discussions and oral and written commentaries, students analyze a contemporary French novel or a French cultural reader, screenplay, or collection of short stories. The course strives, first, to help students read and comprehend modern French writing with confidence, and to be able to talk and write about it in good French; and second, to provide preparation for advanced courses. *Prereq.* LNF 1103.

LNF 1107 Reading French in the Arts and Sciences

4 QH

Designed for students who wish to develop their reading skills, without regard to other aspects of the language such as speaking and writing. Stresses the grammar necessary for reading, together with vocabulary building. Uses scientific and nonscientific texts. May help graduate and undergraduate students who need to pass a reading examination to fulfill specific degree requirements. *Not a substitute for LNF 1103 or LNF 1104.*

LNF 1111 Elementary French for Business

4 QH

Similar to LNF 1101, but has added features relevant to business students, such as specialized vocabulary related to the business world and an immediate introduction to French business texts. *LNF 1102 may be taken as a sequel to LNF 1111.*

LNF 1140 Intensive Intermediate French

8 QH

Continues study of French to further audio-lingual skills and improves reading and writing. Seeks to prepare students for advanced French courses. *Prereq.* LNF 1102.

LNF 1201 Intensive Review of French

4 QH

Reviews the principal structures of French in order to equip students with the knowledge that they will need to participate in advanced courses. Stresses vocabulary expansion, grammar review and drills, comprehension, and reading and speaking skills. Required of all French majors, it serves as prerequisite for all other French courses at the 1200 level. Conducted largely in French. Non-majors are invited as well, as this course is an excellent way to review previous French study.

LNF 1202 Advanced French Proficiency 1

4 QH

Focuses on the students' particular grammar needs as well as the nuances of the language. Designed for qualified students who wish to work on improving their proficiency in speaking and writing French through oral reports, class discussions, compositions, and an advanced review of fundamentals. Varied readings in a range of styles—popular to literary—provide insight into French life and culture. Conducted in French. *Prereq.* LNF 1201 or equivalent.

LNF 1203 Advanced French Proficiency 2

4 QH

Emphasizes further vocabulary building and mastery of fine points of grammar through written composition, prepared oral reports, and reading and discussion of articles from current periodicals. Gives special attention to the latest trends in spoken and written French and the study of idioms. *Prereq.* LNF 1202 or equivalent.

LNF 1204 Advanced French Proficiency 3

4 QH

Continues LNF 1203. Each student is expected to pursue one major project throughout the course, to be completed at the end of the quarter—such as planning and writing an original French magazine with one article to be submitted each week of the term. *Prereq.* LNF 1203 or equivalent.

LNF 1225 Introduction to the French-Speaking World

4 QH

Offers a cultural introduction to the French-speaking world through the study of various reading selections in the textbook *Le Monde Français*. Stresses vocabulary building and proper usage of a wide variety of grammatical forms; also examines the traditional backgrounds and aspects, as well as the contemporary and "pop" aspects, of the cultural heritage of the world's French speakers. Focuses mainly, but not exclusively, on France. *Prereq.* LNF 1104 or equivalent.

LNF 1231 Masterpieces of French Literature 1**4 QH**

Provides an introduction to French poetry, theatre (both comedy and tragedy), novels, and autobiographies through the study of key works from the Middle Ages and Renaissance through the Age of Enlightenment. Includes such writers as Villon, Molière, Racine, Voltaire, and Rousseau. Conducted largely in French. Designed to foster a critical approach to reading, improve reading, speaking, and writing skills; and help students apply these new skills to a greater understanding and appreciation of major French contributions to Western and Francophone culture. Encourages group discussions in an effort to bring out the relation between the texts and contemporary issues. (I) *Prereq.* LNF 1201 or equivalent.

LNF 1232 Masterpieces of French Literature 2**4 QH**

Continues LNF 1231, which is not a prerequisite. Presents some of the most interesting and significant works of literature from the Romantic Age to the present. Readings may include an "existential" play by Musset, poetry by Baudelaire and Verlaine, and fiction by Flaubert, Camus, and Robbe-Grillet. For a description of methodology, see LNF 1231. (II) *Prereq.* LNF 1201 or equivalent.

LNF 1250/LIN 1245 History of the French Language**4 QH**

Examines the development and emergence of the French language from its earliest literary manifestations. Offers the opportunity to become familiar with the language's earlier stages. Emphasizes developing a working knowledge of medieval French. Includes the relationship of Old French to Latin, structural characteristics of Old French, and the impact of historical events on language. Compares different stages of French. Conducted in English. *Prereq.* Reading knowledge of French or permission of instructor.

LNF 1305 French Literature in the Seventeenth Century**4 QH**

Presents a study of the nondramatic literature of seventeenth-century France from the baroque through the classical periods. Covers a rich and diverse body of writing encompassing philosophy, poetry, the table, the novel, and epistolary writing. Among the authors treated are Descartes, Pascal, La Rochefoucauld, La Fontaine, Boileau, Mme. de Sevigne, and Mme. de La Fayette. Offered in alternate years. *Prereq.* LNF 1232 or equivalent.

LNF 1306 French Theatre in the Seventeenth Century**4 QH**

Studies the dramatic literature of seventeenth-century France, from the baroque through the classical periods. Studies tragedy in the works of Corneille and Racine; comedy, in those of Molière. Offered in alternate years. *Prereq.* LNF 1232 or equivalent.

LNF 1307 French Literature in the Eighteenth Century 1**4 QH**

Studies the eighteenth century in France, known as the Age of Enlightenment. It was an age of challenge to established authority in all areas and an age of changing ideas and ideals. This intellectual and political vitality is reflected in the representative works of Marivaux, Montesquieu, Prévost, and Voltaire. Class work includes discussions, oral and written reports. Conducted in French, but English is allowed. Offered in alternate years. *Prereq.* LNF 1232 or equivalent.

LNF 1308 French Literature in the Eighteenth Century 2**4 QH**

Focuses on the latter half of the century when we begin to see both the achievements brought about by the spirit of enlightenment and the awakening of the romantic sensibility, in such authors as Diderot, Rousseau, St. Pierre, Laclos, and Beaumarchais. Class work includes discussions, oral and written reports. Conducted in

French, but English is allowed. Offered in alternate years. *Prereq.* LNF 1232 or equivalent.

LNF 1309 French Literature of the Nineteenth Century 1**4 QH**

Treats romanticism as a major cultural phenomenon. Examines romanticism in poetry and drama, as well as its continuation into the realist novel. Readings include Victor Hugo in poetry and the drama and Honoré de Balzac in the novel, as well as selections from other writers who represent aspects of romanticism and realism. Conducted in French. Offered every other year. *Prereq.* LNF 1232 or equivalent.

LNF 1310 French Literature of the Nineteenth Century 2**4 QH**

Explores the reaction against romanticism: aestheticism and personal modes of expression in contrast to the style of the early romantics. Readings include a novel by Gustave Flaubert and the verse of Charles Baudelaire in *Les Fleurs du Mal*, as well as the poets who followed in his footsteps. Considers Flaubert and Baudelaire as precursors of modern literature. Conducted in French. Offered every other year. *Prereq.* LNF 1232 or equivalent.

LNF 1311 French Literature of the Twentieth Century 1**4 QH**

Offers a study of the major movements in the narrative and dramatic prose writers up to 1950, including Proust, A. France, Colette, Anouilh, and Camus. Requirements include reading a work from each author, discussing it in class, and presenting oral and written reports. Conducted in French. Offered in alternate years. *Prereq.* LNF 1232 or equivalent.

LNF 1312 French Literature of the Twentieth Century 2**4 QH**

Continues the study of the 20th century French literature, with an emphasis on the literary journal from Gide to J. Green. Requirements include reading a work from each author, discussing it in class, and presenting oral and written reports in French. Conducted in French. Offered every other year. *Prereq.* LNF 1232 or equivalent.

LNF 1315 French Poetry, Past and Present**4 QH**

Provides students with a survey of French poetry through the ages, focusing on representative works of the major French poets. Studies poems in their literary and historical context, with an examination of various aspects of French versification. Conducted in French.

LNF 1405 Topics in French**4 QH**

Provides an in-depth study of specific structural aspects of the French language. Subjects will vary from year to year. *Prereq.* LNF 1102 or equivalent.

LNF 1510 Modern Philosophical French Literature in Translation**4 QH**

Studies the works of Camus and Sartre, who are considered the spokesmen for their generation's philosophical concerns. Develops a working knowledge of existentialism. Conducted in English.

LNF 1512 Introduction to Literature**4 QH**

Uses major representative works of fiction from the modern European tradition to introduce students to an array of theoretical and critical perspectives (cognitivism, marxism, formalism, and identity politics). Major authors include Dostoevsky, Mann, Kafka, Camus, Duras, and Achebe. Team taught in English by members of the modern language department. Serves as an introduction to literature for language majors, who can get credit in their field of concentration by reading some of the works in the original language.

LNF 1521 French Film and Culture**4 QH**

Provides an introduction to some of the qualities that have made French film one of the great national cinemas. Focuses on both form and content; relates outstanding directors' major works to the French culture and society of their period. Taught in English; may be taken for French credit if assignments are completed in French. (IV)

LNF 1550 Introductory Film Analysis**4 QH**

Provides a basic introduction to film art and compares and contrasts three styles of filmmaking: expressionism, surrealism, and realism as they have been used in Hollywood cinema and the European art cinema. May be taken for French or German credit with permission of the instructor.

LNF 1551 Film Theory**4 QH**

Investigates the fundamental issues surrounding the nature and possibilities of film art. Introduces a variety of theoretical approaches, including semiotics, auteur theory, psychoanalysis, and feminism. Weekly screenings focus on two or three topics: a film author (such as Buñuel, Truffaut, or Welles), a well-defined film movement (such as neorealism, the New German cinema, or the French New Wave), or films about film-making practice. Coursework includes reading articles and writing a research paper using the resources (including film journals) of the Media Center of Snell Library. (V)

LNF 1560 Film and Psychoanalysis**4 QH**

Explores the nature and possibilities of the psychoanalytic interpretation of film, demonstrating that such an approach offers an additional dimension to the analysis of a work of art. Focuses on elements in the work that are derivative of unconscious processes, especially fantasies, dreams, symbolism, and imagery. Discusses material in the works studied that relates to neurotic conflicts, character structure and formation, interpersonal relationships, and distortions in psychological development. Weekly film screenings will be accompanied by lectures and discussions; each student will select one film (placed on reserve in the Media Center of Snell Library) for individual study on a topic of his/her choice.

LNF 1801, LNF 1802, LNF 1803, LNF 1804, LNF 1805 Directed Study**4 QH each**

Offers students a way of going beyond work given in the regular curriculum; may also enable students to complete major or minor requirements in certain situations. Will not be given in areas adequately covered by existing courses. Priority given to language majors and to juniors and seniors.

LNF 1820, LNF 1821, LNF 1822, LNF 1823**4 QH each****Junior/Senior Honors Project**

For details contact the honors office.

German**LNG 1101 Elementary German 1****4 QH**

Examines basic grammatical structure of German through practice in listening comprehension, speaking, reading, and writing. Includes classroom and language lab instruction. No previous study of German necessary. (Special sections of this course are run for business students.)

LNG 1102 Elementary German 2**4 QH**

Continues LNG 1101. Emphasizes knowledge of the basic grammatical structure of German and flexibility in the four language skills. (Special sections of this course are run for business students.) *Prereq.* LNG 1101 or equivalent.

LNG 1103 Intermediate German 1**4 QH**

Offers a comprehensive review and reinforcement of the major aspects of German grammar and usage; continues to explore the four major skills of listening comprehension, speaking, reading, and writing; introduces the student to the reading of contemporary literary texts, including a full-length play—*Biedermann und die Brandstifter*, by the Swiss playwright Max Frisch. *Prereq.* LNG 1102 or equivalent.

LNG 1104 Intermediate German 2**4 QH**

Offers an opportunity to increase vocabulary as well as flexibility in the four basic language skills. Topics include grammar review, continued exposure to modern literary texts. One full-length play is read—*Der Besuch der alten Dame*, by the contemporary Swiss dramatist Friedrich Dürrenmatt. Successful completion entitles the student to choose from among the upper-level course offerings in the areas of German literature and/or composition and conversation. *Prereq.* LNG 1103 or equivalent.

LNG 1107 Reading German**4 QH**

Offers an opportunity to develop reading skills, disregarding other aspects of the language, such as speaking or writing. Stresses grammar necessary for reading, together with vocabulary building; scientific and nonscientific texts are read. Provides assistance to students, graduate and undergraduate, who need to pass a reading examination to fulfill specific degree requirements.

LNG 1111 Business German 1**4 QH**

Provides an introduction to written German in business administration usage as found in general-purpose professional texts. Develops grammatical knowledge and competence in reading comprehension, translation, and phonetic accuracy. Considers the Federal Republic of Germany as an internationally leading economic power. Discusses weekly readings (in English) from trade publications on aspects of the German business world, including foreign and U.S. trade. Assumes no prior knowledge of German.

LNG 1140 Intensive Intermediate German**8 QH**

Continues study of German to further audio-lingual skills and improves reading and writing. Seeks to prepare students for advanced German courses. *Prereq.* LNG 1102.

LNG 1201 German Composition and Conversation 1**4 QH**

Strives to develop facility in speaking and writing German and stresses active use of the language. Provides an opportunity for practice in listening comprehension through German language films or tape-recorded interviews with native German speakers; expansion of vocabulary through guided group discussions on topics of general interest; and development of language skills in areas of individual interest through preparation of oral reports in German. Includes weekly composition assignments and grammar reviews as needed. Language lab. Recommended for students preparing for co-op in Germany. *Prereq.* LNG 1104 or equivalent.

LNG 1202 German Composition and Conversation 2**4 QH**

Continues German LNG 1201 in content and format with emphasis on independent communication skills. Recommended for students preparing for co-op in Germany. *Prereq.* LNG 1201 or equivalent.

LNG 1231 Masterpieces of German Literature 1**4 QH**

Surveys the major trends in the development of German literature from the Hildebrandslied to Martin Luther. Includes reading of selected works of major authors of the twentieth century such as Hauptmann, Kafka, Mann, Brecht, Dürrenmatt, and Boll. Works

read in a particular term will be based partially on theatre performances or film showings planned in the Boston area. Class attendance of these performances is anticipated. Recommended as an introductory step to literature courses LNG 1307 and above. Offered every other year, alternating with LNG 1232. *Prereq.* LNG 1104 or equivalent.

LNG 1232 Masterpieces of German Literature 2 4 QH
Studies short fiction from Goethe to the present. Includes Goethe's *Die Leiden des Jungen Werthers*, ETA Hoffman's stories of fantasy and madness, Thomas Mann's *Der Tod in Venedig*, and Franz Kafka's *Die Verwandlung*, as well as stories by Böll, Grass, Christa Wolff, and others. Complements readings and lectures in German with musical and screen adaptations of the works. Recommended as an introduction to literature courses LNG 1307 and above. May be taken before LNG 1231. *Prereq.* LNG 1104 or equivalent.

LNG 1309 German Literature of the Nineteenth Century 4 QH
Offers background and general survey of German literature of the nineteenth century, with particular attention to prose and lyric poetry. Includes poems of all the important romantic poets, beginning with Holderlin, Tieck, Novalis, and extending through Morike. Discusses Novellen by Eichendorff, Tieck, Chamisso, Kleist, Fougue, Keller, Meyer, and Ludwig. Lectures (in German) and reports. *Prereq.* LNG 1232 or equivalent.

LNG 1311 German Literature of the Twentieth Century 4 QH
Considers lyric poetry and prose works of important German writers of the twentieth century, including Schnitzler, Hauptmann, Mann, and Kafka. Lectures (in German) and reports. *Prereq.* LNG 1232 or equivalent.

LNG 1405 Topics in German 4 QH
Provides an in-depth study of specific structural aspects of the German language. Subjects will vary from year to year. *Prereq.* LNG 1102 or equivalent.

LNG 1554 Modern German Film and Literature 4 QH
Introduces contemporary issues in German culture. Studies the importance of the Faust legend as a striving for *Unendlichkeit*—going beyond normal human limitations—as expressed in the classicism of Goethe and the expressionist movement in art and film. Explores the balancing of Weimar as compared to Nazi culture. Examines the multiple pressures and complex issues of the post-war era as outgrowths of these earlier periods. Considers major novels, stories, and poems by Boll, Grass, Mann, and Brecht as adapted by a generation of new German filmmakers—Fassbinder, Schlöndorff, Sanders-Brahms, and Wenders. Conducted in English; may be taken for German credit by special arrangement. (IV)

LNG 1801, LNG 1802, LNG 1803, LNG 1804, LNG 1805 4 QH each
Directed Study
Offers students a way of going beyond work given in the regular curriculum and may also serve as a means to complete major or minor requirements in certain situations. Directed studies will not be given in areas adequately covered by existing courses. Priority is given to language majors and to juniors and seniors.

LNG 1820, LNG 1821, LNG 1822, LNG 1823 4 QH each
Junior/Senior Honors Project
For details contact the honors office.

Italian

LNI 1101 Elementary Italian 1 4 QH
Offers the beginner who wants instruction in the essentials of Italian grammar and opportunity to practice speaking and reading the language.

LNI 1102 Elementary Italian 2 4 QH
Continues study of grammar and basic language skills. Practices advanced conversation and reading. *Prereq.* LNI 1101 or equivalent.

LNI 1103 Intermediate Italian 1 4 QH
Reviews grammar. Offers progressively more intensive practice in oral and written communication. Selects readings from modern texts. *Prereq.* LNI 1102 or equivalent.

LNI 1104 Intermediate Italian 2 4 QH
Reviews grammatical difficulties, with attention given to current idiomatic forms. Greater emphasis on self-expression. Reading of short stories or a modern novel. *Prereq.* LNI 1103 or equivalent.

LNI 1201 Italian Composition and Conversation 1 4 QH
Aims at helping students strengthen speaking and writing ability through an analysis of the language, oral and written reports, and general discussions on a variety of topics. For students who have mastered the fundamentals of the language. There will be no study of grammar as such. Conducted entirely in Italian. *Prereq.* LNI 1104 or equivalent.

LNI 1202 Italian Composition and Conversation 2 4 QH
Continues LNI 1201. Stresses individual work, free discussions, and compositions. Conducted entirely in Italian. *Prereq.* LNI 1201 or equivalent.

LNI 1311 Italian Literature of the Twentieth Century 1 4 QH
Explores some of the novels, plays, and poems from a variety of literary trends and styles that evolved between the turn of the century and World War II. Studies authors such as Verga, Pascoli, D'Annunzio, Pirandello, Deledda, and Svevo. Oral and written reports. Conducted in Italian, but students may use English. Offered in alternate years. *Prereq.* LNI 1232 or equivalent.

LNI 1312 Italian Literature of the Twentieth Century 2 4 QH
Examines the postwar period to the present. Considers the many important authors since the early forties, and their books reflecting the preoccupations, moods, and aspirations of our changing times. Includes writers such as Moravia, Silone, Vittorini, Pavese, Guareschi, Buzzati, Sciascia, Ungaretti, Montale, and Quasimodo. Requires oral and written reports. Conducted in Italian, but students may use English. Offered in alternate years. *Prereq.* LNI 1232 or equivalent.

LNI 1510 The Works of Dante in Translation 1 4 QH
Considers briefly the cultural background and various literary schools that influenced Dante. His life, his character, and minor works are discussed. The *Vita Nuova* and the first cantica of the *Divina Commedia*, the "Inferno," are read and analyzed in some detail. This course is intended for students of any background or major. Bilingual texts are used so that students with a background in Italian and others, may refer to the original for added interest and enrichment. Conducted in English. (III)

LNI 1511 The Works of Dante in Translation 2**4 QH**

Continues LNI 1510, but may be taken separately. Studies in detail the other two parts of the *Divina Commedia*, "Purgatorio" and "Paradiso." Open to anyone. Bilingual texts used. Conducted in English.

LNI 1512 Italian Seminar: Pirandello**4 QH**

Examines the originality and art of Pirandello by a close study of some of his great plays and short stories. Classwork includes discussions and oral and written reports. Conducted in English.

LNI 1801, LNI 1802, LNI 1803, LNI 1804, LNI 1805 Directed Study 4 QH each

Offers students a way of going beyond work given in the regular curriculum and may also serve as a means to complete major or minor requirements in certain situations. Directed studies will not be given in areas adequately covered by existing courses. Priority is given to language majors and to juniors and seniors.

LNI 1820, LNI 1821, LNI 1822, LNI 1823**4 QH each****Junior/Senior Honors Project**

For details contact the honors office.

Linguistics**LNL 1220/LIN 1220 Introduction to Phonetics and Phonology****4 QH**

Explores the acoustic and articulatory basis of phonology. Emphasizes hands-on experience with standard areas in modern phonology, including phonetics, phonetic variation, natural classes of sounds, phoneme alternations, rule systems, and prosodic phonology. Introduces major contemporary theories including autosegmental phonology and feature geometry.

LNL 1235/LIN 1235 Applied Linguistics**4 QH**

Explores the solution of language-based re-world problems. Solutions to these problems depend on information not only from linguistics, but also from a variety of other disciplines such as anthropology, sociology, education, ethnic and area studies (including literature), and public administration. Studies the relationship of linguistics to applied linguistics; second language acquisition; second and foreign language teaching; language policy and planning; and the linguistic aspects of multiculturalism.

LNL 1240/LIN 1240 Bilingualism**4 QH**

Focuses on the fact that half of the world's population is bilingual, that is, uses two or more languages on a regular basis. Also explores the fact that bilingualism remains a poorly understood phenomenon surrounded by a number of myths: those that hold that bilinguals are found in bilingual countries and are equally fluent in their languages; that bilingual children suffer from cognitive impoverishment; bilingual education hinders the assimilation of minority groups. Reviews all aspects of bilingualism (in the world, in society, in the child, and in the adult). Discusses topics such as biculturalism and language change.

LNL 1260/LIN 1260 Introduction to Romance Linguistics**4 QH**

Provides a general linguistic introduction to one of the most important language families. Discusses the structural characteristics of several Romance languages. Includes defining a language family, how and why languages change, and the relationship of standard and nonstandard linguistic varieties. Studies contemporary theoretical issues in Romance linguistics including object pronoun placement, word order, creolization, and subject pronouns use. Conducted in English. *Prereq.* Reading knowledge of one Romance language or permission of instructor.

Russian**LNR 1101 Elementary Russian 1****4 QH**

Explores the essentials of grammar, practice in pronunciation, progressive acquisition of a basic vocabulary, idiomatic expressions.

LNR 1102 Elementary Russian 2**4 QH**

Continues grammar study; oral and written exercises. *Prereq.* LNR 1101.

LNR 1103 Intermediate Russian 1**4 QH**

Offers further knowledge of Russian through oral and written work; the study of grammar, and reading texts of moderate difficulty. *Prereq.* LNR 1102.

LNR 1104 Intermediate Russian 2**4 QH**

Continues LNR 1103. *Prereq.* LNR 1103.

LNR 1201 Russian Composition and Conversation 1**4 QH**

Offers assistance in developing skills in speaking and writing by means of detailed grammar review and extensive use of audio-visual media. Conducted in Russian. *Prereq.* LNR 1104 or equivalent.

LNR 1202 Russian Composition and Conversation 2**4 QH**

Continues LNR 1201 with an increased emphasis on speaking the colloquial Russian idiom. Conducted in Russian. *Prereq.* LNR 1201 or equivalent.

LNR 1205 Stylistics and Advanced Grammar Analysis 1**4 QH**

Designed for students pursuing a major or minor in the Russian language; focuses on modern usage of the Russian language through newspaper and magazine articles and short stories. *Prereq.* LNR 1104 or permission of instructor.

LNR 1309 Russian Short Stories of the Nineteenth Century**4 QH**

Offers detailed analysis of selected representative short stories read in Russian; study of the development of this genre. *Prereq.* LNR 1104 or equivalent.

LNR 1315 Russian Expository Prose**4 QH**

Analyzes lectures, speeches, essays, and critical studies by outstanding Russian scholars. *Prereq.* LNR 1104.

LNR 1316 Russian Folklore**4 QH**

Explores various genres of Russian folk literature in Russian. Readings are supplemented with lectures and tape recordings. *Prereq.* LNR 1104.

LNR 1500 Backgrounds in Russian Culture**4 QH**

Designed to offer the student a view of Russian culture and civilization; includes guest speakers, films, field trips, and discussions. Conducted in English.

LNR 1510 The Works of Alexander Pushkin in English Translation**4 QH**

Offers a survey and analysis in English of Pushkin's artistic prose, lyric poetry, correspondence, friendships, and major literary influences. Conducted in English.

LNR 1511 Russian Literature in English Translation**4 QH**

A companion to LNR 1510; provides a survey and analysis in English of some of the works of Tolstoi, Dostoevski, Chekhov, and others. Conducted in English.

LNR 1801, LNR 1802, LNR 1803, LNR 1804, LNR 1805 4 QH each**Directed Study**

Directed studies offer students a way of going beyond work given in the regular curriculum and may also serve as a means to complete major or minor requirements in certain situations. Directed studies will not be given in areas adequately covered by existing courses. Priority is given to language majors and to juniors and seniors.

LNR 1820, LNR 1821, LNR 1822, LNR 1823 4 QH each**Junior/Senior Honors Project**

For details contact the honors office.

Spanish

LNS 1101 Elementary Spanish 1 4 QH

Presents essentials of correct usage through acquisition of basic skills in reading, writing, speaking, and aural comprehension.

LNS 1102 Elementary Spanish 2 4 QH

Continues language instruction with increasing attention to vocabulary and skills relevant to persons who wish to become involved with the Hispanic world. *Prereq. LNS 1101 or equivalent.*

LNS 1103 Intermediate Spanish 1 4 QH

Includes completion of basic grammatical usage; reading of contemporary Hispanic plays; and oral and written communication based upon assigned readings. *Prereq. LNS 1102 or equivalent.*

LNS 1104 Intermediate Spanish 2 4 QH

Offers intensive reading of current topics, conversation practice utilizing skills acquired in previous coursework, and composition practice based upon varied assigned topics. *Prereq. LNS 1103 or equivalent.*

LNS 1105 Conversational Spanish 1 4 QH

Emphasizes developing the ability to speak and comprehend Spanish. Particularly able students may be accepted after having completed only LNS 1103. In this case, LNS 1105 may be used to satisfy the language requirement. *Prereq. LNS 1104 or equivalent; open to nonmajors only.*

LNS 1106 Conversational Spanish 2 4 QH

Continues LNS 1105, with further emphasis on the development of oral facility in Spanish. Particularly able students may be accepted after having completed only LNS 1104. *Prereq. LNS 1105 or equivalent; open to nonmajors only.*

LNS 1130 Intensive Spanish 8 QH

Encompasses the same material covered in LNS 1101 and LNS 1102. Students with language-learning ability and a commitment to the study of foreign languages are encouraged to take the course. Students are expected to assimilate the material at an accelerated pace. This is a two-sequence course; students must enroll in both sequences. Satisfactory completion of this course enables the student to take LNS 1103.

LNS 1140 Intensive Intermediate Spanish 8 QH

Continues study of Spanish to further audio-lingual skills and improves reading and writing. Seeks to prepare students for advanced Spanish courses. *Prereq. LNS 1102.*

LNS 1201 Spanish Composition and Conversation 1 4 QH

Offers practice in writing and speaking Spanish, including written and oral resumes, prepared speeches and themes, and impromptu speaking and writing. Reviews the more subtle problems of grammar.

LNS 1202 Spanish Composition and Conversation 2 4 QH

Offers further practice in oral and written Spanish; continues study of advanced Spanish grammar. *Prereq. LNS 1201 or equivalent.*

LNS 1203 Advanced Spanish Proficiency 1 4 QH

Covers advanced elements of Spanish syntax, with emphasis upon achieving superior speaking, reading, and writing skills. Designed for those preparing to enter the teaching profession as well as qualified advanced students. *Prereq. Permission of instructor.*

LNS 1204 Advanced Spanish Proficiency 2 4 QH

Continues the aims and goals of LNS 1203. *Prereq. LNS 1203 and permission of instructor.*

LNS 1231 Masterpieces of Spanish Literature 1 4 QH

Traces the development of Spanish literature from the Middle Ages (las jarchas, *El poema del Cid*, *El libro de buen amor*, *La Celestina*) through the Renaissance and Baroque periods or Golden Age (Garcilaso de la Vega, the picaresque novel, the mystics, Cervantes, Lope de Vega, Calderon). Conducted in Spanish. (II) *Prereq. LNS 1104 or equivalent.*

LNS 1232 Masterpieces of Spanish Literature 2 4 QH

Continues LNS 1231. Surveys the literature of eighteenth-, nineteenth-, and twentieth-century Spain. Includes the literary movements of romanticism, realism, and the generation of '98. Conducted in Spanish. (II) *Prereq. LNS 1104 or equivalent.*

LNS 1250 History of the Spanish Language 4 QH

Examines the development and emergence of the Spanish language. Offers the opportunity to become familiar with the language's earlier stages. Emphasizes developing a working knowledge of medieval Spanish. Includes the relationship of old Spanish to Latin, structural characteristics of Old Spanish, and the impact of historical events on language. Compares different stages of Spanish. Conducted in English; however, the textbook is in Spanish. *Prereq. Reading knowledge of Spanish or permission of instructor.*

LNS 1301 Spanish Medieval Literature 4 QH

Examines the origins of Spanish Literature from the tenth through the fourteenth centuries. Included among the texts for this class are excerpts from the *jarchas*; the *Poema de Mio Cid*; Berceo's saints' lives; the histories of Alfonso X; *El Conde Lucanor*; *El Libro de Buen Amor*. Also examines non-literary texts such as wills and laws for their historical and literary relevance.

LNS 1306 Spanish Golden Age Theatre 4 QH

Examines plays by the outstanding dramatists of the seventeenth century: Lope de Vega, Calderon de la Barca, Tirso de Molina, Ruiz de Alarcón, and others. Conducted in Spanish. *Prereq. LNS 1232 or equivalent.*

LNS 1309 Spanish Literature of the Nineteenth Century 1 4 QH

Covers readings in the prose, poetry, and drama of the romantic period, including selections from el Duque de Rivas, Larra, Espronceda, Zorrilla, and Becquer. Conducted in Spanish. *Prereq. LNS 1232 or equivalent.*

- LNS 1310 Spanish Literature of the Nineteenth Century 2** 4 QH
Offers a study of some of the major novelists of the second half of the nineteenth century, such as J. M. de Pereda, Juan Valera, Emilia Pardo Bazan, and B. Perez Galdos. Conducted in Spanish. *Prereq.* LNS 1232 or equivalent.
- LNS 1311 Spanish Literature of the Twentieth Century 1** 4 QH
Examines selections from the writings of the Generation of '98: Unamuno, Valle-Inclan, Pio Baroja, Benavente, Azorin, and the Machado brothers. *Prereq.* LNS 1232 or equivalent.
- LNS 1312 Spanish Literature of the Twentieth Century 2** 4 QH
Focuses on prose and poetry of modern writers, such as Ortega y Gasset, Perez de Ayla, Garcia Lorca, Juan Ramon Jimenez, Gironella, and Jose Cela. *Prereq.* LNS 1232 or equivalent.
- LNS 1315 Latin American Literature 1** 4 QH
Focuses on Latin American literature from the colonial period to the nineteenth century. Students read a variety of short pieces from an anthology, followed by a full-length work. Authors read include Bernal Díaz, Sor Juana, Jorge Isaacs and José Hernández. *Prereq.* LNS 1204 or equivalent.
- LNS 1316 Latin American Literature 2** 4 QH
Focuses on Latin American literature from the late nineteenth century to the contemporary period. Students read a variety of short pieces from an anthology, followed by a full-length work. Authors read include Martí, Borges, Castellanos and Vargas Llosa. *Prereq.* LNS 1204 or equivalent.
- LNS 1400 Spanish Seminar** 4 QH
Focuses upon a narrowly defined theme (that is, a single author, a single work, or a single theme), which students are asked to explore in depth; students are expected to present a final paper based upon individual research. Designed primarily for majors who have progressed to the upper-level literature courses in Spanish. However, nonmajors who show exceptional background may be admitted with the instructor's permission.
- LNS 1401 Seminar in Spanish Literature** 4 QH
Focuses on a selected group of Galdos's novels through detailed discussion and analysis of the novels and collateral readings. An upper-level literature course designed primarily for majors; nonmajors who show exceptional background in Spanish may be admitted. *Prereq.* Permission of instructor.
- LNS 1402 Seminar in the Contemporary Spanish Theatre** 4 QH
Examines a number of dramatists committed to revealing the tragic social and existential aspects of the human condition in contrast to the bourgeois theatre of consumption in Spain. Emphasis is placed on authors such as Vallejo, Sartre, the members of the *generacion realista*, and the "underground" playwrights. Conducted in Spanish. Class participation as well as oral and written projects required. Alternates yearly with LNS 1401. *Prereq.* LNS 1232 or permission of instructor.
- LNS 1405 Topics in Spanish** 4 QH
Provides an in-depth study of specific structural aspects of the Spanish language. Subjects will vary from year to year. *Prereq.* LNS 1102 or equivalent.
- LNS 1500 Backgrounds of Spanish Culture** 4 QH
Examines chronologically the forces which have forged Spanish culture and have made Spain the nation it is today. Traces the development of Spain from the prehistoric caves of Altamira to the present. Observes past and present concerns such as divorce and abortion in a Catholic country, education, the role of women, linguistic diversity, separatism and terrorism, and the incorporation of Spain into the European Community. Incorporates history, sociology, anthropology, geography, economics, and politics. Conducted in English. (IV)
- LNS 1501 Backgrounds of Latin American Culture** 4 QH
Introduces students to Latin American culture through the study of a broad array of literary and critical writings by Latin American authors and selected films from Latin America. Authors read include Sor Juana, García Márquez, and Jorge Amado. Conducted in English. (IV)
- LNS 1506 Cervantes and His Times** 4 QH
Introduces students to *Don Quijote de la Mancha*, Cervantes' major work as well as Spain's greatest masterpiece and its supreme gift to Western culture. Studies Cervantes' minor works, *The Exemplary Novels* and *Interludes*. Examines literary, sociological, philosophical, and historical matters: the development of the novel, genre and narratology, role playing and representation, Spain's triumphs and defeats. Deals with the Spanish Inquisition and censorship and themes such as madness, truth and lying, and appearance and reality. Conducted in English. (III)
- LNS 1510 Saints and Sinners: The Vision of Women in the Middle Ages and the Renaissance** 4 QH
Examines the attainment of and the atonement for love and society's changing attitude toward women as reflected in the literature of the times. Covers selected fabliaux, short stories, poems, and plays from Boccaccio, Chaucer, Ruiz, Rojas, Machiavelli, Lope de Vega, Calderon, Quevedo, Racine, Middleton, as well as women writers. Reference is made to historical and sociological materials. Conducted in English. All required readings are in translation.
- LNS 1511 Introduction to Caribbean Literature** 4 QH
Provides a comparative introduction to the modern literary traditions of the Spanish-, English-, and French-speaking Caribbean. Includes authors such as Carpentier (Cuba), Naipaul (Trinidad), Zobel (Martinique), and Cardenal (Nicaragua).
- LNS 1512 The Don Juan Figure in Literature** 4 QH
Examines the emergence and development of the Don Juan figure in Western literature. Analyzes the character of Don Juan, beginning with his first appearance in the theater of seventeenth-century Spain, and following his development well into the twentieth century. Strives to develop an appreciation and understanding of the character of Don Juan through the centuries, and to analyze the similarities and the differences that may be seen in the character from one cultural milieu to another. Conducted in English; non-English works read in translation. (III)
- LNS 1550 Spanish Civil War in Spanish Film** 4 QH
Introduces the Spanish film and provides an understanding of the Spanish Civil War (1936–1939). Uses a semiotic approach; studies images of the Spanish Civil War in photographs and posters to show how fictional and historical texts are transferred to the screen. Examines both documentaries and award-winning feature films by prominent Spanish directors. Demonstrates how the realism of the Spanish cinema is combined with surrealist imagery and metaphor to create a distinctive visual style. (III)

LNS 1801, LNS 1802, LNS 1803, LNS 1804, LNS 1805**4 QH each****Directed Study**

Offers students a way of going beyond work given in the regular curriculum; may also enable students to complete major or minor requirements in certain situations. Will not be given in areas adequately covered by existing courses. Priority given to language majors and to juniors and seniors.

LNS 1820, LNS 1821, LNS 1822, LNS 1823**4 QH each****Junior/Senior Honors Project**

For details contact the honors office.

Music

MUS 1100 Introduction to Music**4 QH**

Offers an introduction to selected works of our Western musical heritage, from earliest to contemporary styles. Consists primarily of a survey and listening format, with emphasis on styles, basic theory, forms, and the historical, social, and artistic periods that these works represent. (II)

MUS 1101 Music: A Listening Experience**4 QH**

Offers a computer-based "how to listen to classical music" course that assumes no previous musical knowledge. Studies masterworks of Western music but develops listening skills that are globally applicable. Students proceed at their own pace under the guidance and supervision of the instructor. All listening is done at a computer in the Media Center in room 200 Snell Library.

MUS 1103 Music as a Social Expression**4 QH**

Examines the processes of music-making and the perceptions of music's functions in our culture. Considers how music is made, what music means, what kind of music is made, and what music is made to be meaningful. Identifies styles and genres of music and examines them within an ever-shifting context of aesthetics, social history, and cultural change. (III)

MUS 1104/AFR 1153 Survey of African-American Musics**4 QH**

Explores the various musical traditions of African-Americans, with a specific focus on the United States. Examines the impact of African, European, and Native American traditions on African-American music as well as the role of music as an expression of African-American aesthetics, traditions, and life. Considers historical and contemporary forms of African-American musics, with selected video presentations of musical styles.

MUS 1105 Music of the U.S.A.**4 QH**

Examines American music from the time of Puritan psalm singing to the present. Covers a wide variety of music, including concert music, traditional folk music, jazz, and contemporary styles. (V)

MUS 1106 Women in Music**4 QH**

Examines the multi-faceted role of women in music from the Renaissance through to the present. Discusses the fact that for centuries women have been active and influential patrons, composers, teachers, conductors, and performers in Europe and America. Examines their contributions to classical and popular music and to jazz, with emphasis on such widely varying figures as Elizabeth Jacquet de la Guerre, Fanny Mendelssohn Hensel, Clara Schumann, Amy Beach, Germaine Tailleferre, Billie Holiday, Carla Bley, Ruth Crawford Seeger, Pauline Oliveros, Sarah Caldwell, Antonia Brico, and Nadia Boulanger.

MUS 1107 Principles of Music Literature**4 QH**

Examines the evolution of each major structural element of music through a historical perspective. Also, attempts to link larger categories of music such as classical, popular, and non-Western by examining their common elements. Required of all music majors. *Prereq.* *Permission of instructor.*

MUS 1109 Introduction to Art, Drama, and Music**4 QH**

Offers an interdisciplinary approach to music and other arts including painting, film, and theater. Examines works of art from various periods in the context of the cultures that produced them. Supplements regular classes with visits to art museums or attendance at concerts and theatrical performances. (II)

MUS 1110 Music in Popular Culture**4 QH**

Deals with the nature of music composed for the mass market. Discusses techniques of recording and merchandising music and selected songs analyzes for their musical content. Traces the evolution of various styles, including ragtime, jazz, blues, rock, and music for the media.

MUS 1111 Rock Music**4 QH**

Examines the development of rock'n'roll and its relationship to blues, rhythm and blues, country, folk, and other styles of music. Considers themes such as the role of rock as youth music, the reflections of social realities in rock songs, the relationship of rock to the recording industry and the mass media, and the changing styles of rock. Emphasizes listening skills.

MUS 1112 Jazz**4 QH**

Examines the evolution of the creative improvisational musical styles commonly called jazz from its African-American roots to its status as one of America's classical musics and an internationally valued art form. Explores the contributions of African and European musical traditions and African-American spirituals, work songs, and blues. Examines major contributors and stylistic development and change through selected audio and audio-visual presentations. Also considers the socio-cultural dynamics that have affected musical evolution and acceptance.

MUS 1120 Topics in Music History**4 QH**

Provides a chronological view of Western music, while examining the role of music in society and exploring the contributions of influential composers. Discusses representative works from each period, including music by composers such as Machaut, Josquin, Bach, Handel, Mozart, Haydn, Beethoven, Berlioz, Wagner, Mahler, and Stravinsky. (III) *Prereq.* *MUS 1201.*

MUS 1121 Medieval and Renaissance Music**4 QH**

Offers an introduction to European music from the sixth through the sixteenth centuries. Covers a wide variety of music, ranging from the serene elegance of sacred Gregorian chant and the plaintive love songs of the medieval troubadours to the lively dances and humanistic vocal music of the Renaissance. Examines representative works by composers such as Machaut, Landini, Josquin, Palestrina, and Dowland.

MUS 1122 Music of the Baroque Era**4 QH**

Focuses on music of the seventeenth and early eighteenth centuries in Italy, Germany, France, and England. Discusses the emergence of important new genres (such as opera, sonata, and concerto) and examines representative works of major composers (such as Bach, Handel, Corelli, Vivaldi, Rameau, and Purcell).

MUS 1123 Music of the Classical Era**4 QH**

Focuses on crucial developments in musical styles and forms of the late eighteenth century and on emerging genres, such as the symphony, the concerto, and the string quartet. Emphasizes the vocal and instrumental works of Haydn and Mozart and the early works of Beethoven

MUS 1124 Music of the Romantic Era**4 QH**

Focuses on romantic realism and idealism as expressed in the music of the nineteenth century. Emphasizes historical, nationalistic, and literary influences. Includes composers such as Beethoven, Schumann, Schubert, Berlioz, Liszt, Verdi, Wagner, Brahms, Tchaikovsky, and Mahler. (V)

MUS 1125 Twentieth-Century Music**4 QH**

Focuses on developments in music from 1900 to the present. Examines a broad range of musical styles, including expressionism, neo-classicism, and other major trends in music of the twentieth century. (V)

MUS 1126 New Directions in Music**4 QH**

Recognizes that music from 1950 to the present has changed more radically than during any other era in history. Examines new elements in classical and popular music and focuses on the relationship between the two styles.

MUS 1130 The Symphony**4 QH**

Studies the symphony as a major genre in the classical, romantic, and contemporary periods. Includes works by composers such as Haydn, Mozart, Beethoven, Schumann, Tchaikovsky, Brahms, Sibelius, and Prokofiev.

MUS 1131 Piano Music: The Great Composers and Performers**4 QH**

Gives students the opportunity to hear and analyze some of the greatest works for piano, performed by some of the world's greatest performers. In addition to recordings by internationally acclaimed artists, presents live performances by guest artists from the Boston area.

MUS 1132 Introduction to Opera**4 QH**

Offers an analysis of opera as a dramatic genre. Isolates and discusses aria, recitative, ensemble, and other basic elements of opera. Considers number opera, music drama, and Singspiel types of opera. Includes composers such as Mozart, Wagner, Verdi, and Puccini.

MUS 1133 Great Choral Literature**4 QH**

Analyzes sacred and secular choral literature from medieval to contemporary times.

MUS 1134 Music and Poetry**4 QH**

Examines the art of setting words to music. Confronts the aesthetic problems encountered in a synthesis of two different art forms. Examines that synthesis in selected songs, choral works, tone poems, and operas of diverse periods and styles (classical, folk, and popular). (III)

MUS 1139 Film Music**4 QH**

Surveys the use of music in film and video and gives an overview of the mechanics of synchronization and the psychological implications of applying music to film. Analyzes specific dramatic situations, followed by discussion of such scoring techniques as click tracks and picture recording. Studies films such as *The Informer*,

Alexander Nevsky, *Citizen Kane*, *Forbidden Planet*, *Woman in the Dunes*, and *Tron*. Discusses the works and careers of specific film composers such as David Raskin, Aaron Copland, Jerry Goldsmith, Sergei Prokofiev, and John Williams.

MUS 1140 Mozart**4 QH**

Traces Mozart's musical development from child prodigy to mature artist through personal letters and biographies. Analyzes many of his major compositions, including symphonies, concertos, operas, and chamber works.

MUS 1144 Debussy and the Music of Paris**4 QH**

Recognizes that Claude Debussy, impressionist in sound, composed music that marked a turning point toward modern trends. Covers much of his music for piano, orchestra, and voice, including *Suite Pour le Piano*, *Suite Bergamasque*, *Images* (for piano and orchestra), *Nocturnes*, *La Mer*, and *Pelleas et Melisande*. Discusses the music of Satie, Ravel, and Fauré as it relates to that of Debussy.

MUS 1145 Beethoven**4 QH**

Analyzes the complex personality and art of Beethoven, his relation to the turbulent times in which he lived, and his role in classical and romantic music. (III)

MUS 1146 George Gershwin**4 QH**

Studies the life and works of George Gershwin (1898-1937), including popular song, musical comedy, opera, and orchestral compositions. Explores the relationship of George Gershwin to his times, both musically and historically. Takes as a critical starting point Gershwin's famous statement, "My people are American; my time is today."

MUS 1161 Music Therapy 1**4 QH**

Examines the application of music as a therapeutic vehicle to release suppressed emotions, to encourage self-expression in psychiatric patients, and to treat a wide variety of disorders. Examines music therapy, in a modern approach to health services, as a supplement to other treatments.

MUS 1162 Music Therapy 2**4 QH**

Examines the etiologies, characteristics, and applications of music therapy with the physically handicapped, hearing impaired, visually impaired, learning disabled, emotionally disturbed, speech/language impaired, and geriatric populations in one-to-one and group settings. In addition, studies improvisations and appropriate music materials for the nonmusician and adapted instrument designs tailored to each disability, while exploring the correlation of music and movement. Compares various musical therapy approaches; includes field trips to musical therapy sites in and around Boston. *Prereq.* MUS 1161.

MUS 1163 Sound Health**4 QH**

Gives both musicians and non-musicians the opportunity to experience a heightened awareness of the power of music to effect physical and emotional change. Examines the effects of music on the body, mind, and spirit. Begins with an exploration into the awareness of sound and the physiological changes in the body caused by music, and moves through a variety of theories and techniques used to facilitate positive change, relaxation, and reduction of stress. Also considers sound pollution, the effects of vibrations on the body, guided imagery, music and meditation, and new-age environmental music.

MUS 1165 The Music Industry 1**4 QH**

Examines business-related areas of the music industry. Includes topics such as the make-up and structure of the record industry and music publishing world, the function of performing rights organizations (ASCAP and BMI), and the role of concert and orchestral managers. Includes guests from the various fields who will be invited to lecture in class.

MUS 1166 The Music Industry 2**4 QH**

Continues MUS 1165. Covers such topics as artist management, theatrical production, concert promotion, music merchandising, and royalties and contracts. Requires students to undertake case studies of local musical organizations, both on and off campus. *Prereq.* MUS 1165.

MUS 1167 Music Management**4 QH**

Introduces music management, including the structure of nonprofit organizations (such as arts service organizations, arts centers, symphony orchestras, chamber orchestras, ensembles, opera companies, and university arts programs) and the structure of profit enterprises. Examines financial management, funding, and audience development. *Prereq.* MUS 1166 or permission of instructor.

MUS 1170 Music and Technology**4 QH**

Studies the applications of contemporary technology to music. Discusses basic acoustics, analog and digital recording techniques, computer sound synthesis, and the aesthetics of electronic music. Requires no prerequisites in physics or music theory; however, takes into consideration the particular backgrounds of individual students for projects and papers.

MUS 1171 Computer Literacy for Musicians**4 QH**

Provides students with training in the use of a computer for numerous music applications including music transcription and notation, sequencing, orchestration, sound design, and computer-assisted instruction. Students undertake various projects in each of these areas to prepare themselves for the computer-related components of courses throughout their music curriculum.

MUS 1172 Introduction to Music Recording**4 QH**

Introduces the history and practice of recording music. Covers recording apparatus; microphones; monophonic, stereophonic, and digital theory and techniques; field recording; studio terminology; basic sound theory; and development of rudimentary editing skills. Also examines the role of the producer versus that of the technician, preparation for recording sessions, and basic legal regulations regarding copyrights and compensation.

MUS 1173 Music Recording 2**4 QH**

Offers the opportunity to learn additional skills in the recording process such as material marketing and distribution, contracts and negotiations, and establishing distribution channels. Includes hands-on studio production of record-quality material. *Prereq.* MUS 1172.

MUS 1180 Introduction to World Music**4 QH**

Introduces musical traditions from around the world using ethnomusicological approaches to examine the role of music in culture. Focuses on various world musics from the perspectives of the people who create the music and compares these perspectives with our own.

MUS 1181/AFR 1156 Music of Africa**4 QH**

Surveys various African musical traditions with respect to their historical, social, and cultural heritage. Examines traditional and contemporary African musics, instruments, and performance traditions.

MUS 1182 Music of the Middle East**4 QH**

Presents an introduction to the music of selected Near Eastern and Arab cultures (such as Persian in the East and Ethiopic and Berber in Africa). Includes the cantillation styles and practices of various chants of the Hebrew, Christian, and Islamic traditions.

MUS 1183 Music of East Asia**4 QH**

Introduces the student to the musical heritage of East Asia by examining music history, the relationship of music cultures to each other, the organization of musical sounds, and music as an aspect of culture. Emphasizes development of basic listening skills. (IV)

MUS 1184 Musics of South America, Latin America, and the Caribbean**4 QH**

Examines the highly diverse and unique musical practices of South America, Latin America, and the Caribbean. Focuses on the traditions of native, African, and European heritage in these geographical areas. Provides exposure to musical repertoires, ideas about music, the relationship of music to culture, musical instruments, musical contexts, and musical syncretism. (IV)

MUS 1185 The Music of the Jewish People**4 QH**

Investigates the role that music has played in Jewish life from ancient to modern times. Topics to be studied include: music in the time of *The Bible*, Rabbinic attitudes toward music, music and mysticism, the development of the modes for prayer and scriptural cantillation, church and synagogue music compared, music of the holidays and the life cycle, folk and popular music in the diaspora, the development of art music in the modern era, and music in modern Israel. *Prior knowledge of music is not required.*

MUS 1200 Fundamentals of Music**4 QH**

Provides basic instruction for those who want to learn how to read music or how to write a tune. Gives students the opportunity to learn to sight-read music and to compose in some of the basic forms. Students may elect to take MUS 1210 for one extra credit.

MUS 1201 Music Theory 1**4 QH**

Continues MUS 1200. Offers the opportunity to improve melodic and rhythmic dictation skills; introduces melodic and harmonic practices to tonal music with additional work in chord and melody construction, leading to the composition of simple four-voice chorales. Students may elect to take MUS 1210 for one extra credit.

MUS 1202 Music Theory 2**4 QH**

Continues MUS 1201. Focuses on harmonic practices in tonal music. Examines the role and function of harmony through analysis of musical examples and composition of four-voice chorales. Students may elect to take MUS 1210 for one extra credit. *Prereq.* MUS 1201.

MUS 1203 Music Theory 3**4 QH**

Continues MUS 1202 and focuses on aspects of chromatic harmony. Discusses the construction and function of borrowed chords, altered chords, and non-diatonic harmony. Students may elect to take MUS 1210 for one extra credit. *Prereq.* MUS 1202.

MUS 1204 Music Theory 4**4 QH**

Introduces the student to methods of musical analysis. Examines phrasing, periodicity, tension-repose, and other structural factors of musical compositions. Students may elect to take MUS 1210 for one extra credit. *Prereq.* MUS 1203.

MUS 1209 Functional Piano**4 QH**

Gives students the opportunity to develop the keyboard skills appropriate for an undergraduate concentration in music. Studies realization of a figured bass, the harmonization of a melodic line, simple score reading (including treble, bass, alto, and tenor clefs), transposition, sight-reading, and the ability to play any of the major or minor scales. *Prereq.* MUS 1202.

MUS 1210 Music Theory Lab**1 QH**

Provides both group and individual instruction in ear training, sight-singing, and keyboard skills. This lab can be taken only in conjunction with the department's music theory courses (MUS 1201, MUS 1203, MUS 1204). May be repeated for credit.

MUS 1211 Sight-singing**4 QH**

Offers students the opportunity to learn how to read music at sight without the aid of a musical instrument, an essential skill for every musician. Emphasizes mastery of the skills of rhythm reading, as well as solfège and triad recognition in all diatonic keys, through class instruction and daily practice. Requires knowledge of the fundamentals of musical notation. *Prereq.* MUS 1201 or equivalent.

MUS 1230 Chorus**1 QH**

Allows students to participate as performers in one or more ensembles under the direction of a faculty conductor. May be repeated for credit. *Prereq.* Permission of instructor.

MUS 1231 Band**1 QH**

Allows students to participate as performers in one or more ensembles under the direction of a faculty conductor. May be repeated for credit. *Prereq.* Permission of instructor.

MUS 1232 Chamber Ensembles and Orchestra**1 QH**

Allows students to participate as performers in one or more ensembles under the direction of a faculty conductor. May be repeated for credit. *Prereq.* Permission of instructor.

MUS 1233 Early Music Players**1 QH**

Allows students to participate as performers in one or more ensembles under the direction of a faculty coach. May be repeated for credit. *Prereq.* Permission of instructor.

MUS 1241 Piano Class 1**4 QH**

Provides introductory-level study of piano designed for students with or without previous experience. Combines skills in reading music with improvisation and functional piano. Introduces some basic theory to help clarify the structure of class repertoire. Allows students to progress at their own pace. Determines grades by the amount of repertoire mastered during the quarter.

MUS 1242 Piano Class 2**4 QH**

Continues the skills developed in MUS 1241, with emphasis on increasing students' flexibility at the keyboard through the study of scales, transposition, and modulation. *Prereq.* MUS 1241.

MUS 1244 Voice Class 1**4 QH**

Gives students the opportunity to learn the basic vocal production required for fine singing. Chooses repertoire, both classical and

contemporary, for each student to learn and perform in lessons and before the entire class. Covers the following subjects: diction, the physiology of singing, resonance, registers, and interpretation. Also studies the basics of music reading and sight-singing. Discusses some interpretation and plays recordings of the greatest vocal artists for class analysis. *Prereq.* Permission of instructor.

MUS 1247 Guitar Class 1**4 QH**

Provides an introduction to the fundamentals of classical guitar playing for those with or without prior knowledge of the guitar. Covers music reading and theory. Requires students to perform alone and in ensemble with other members of the class. Augments the syllabus by live performances from outside professional and student classical guitarists. Bases final grades on several written examinations and student performance.

MUS 1250 Conducting**4 QH**

Provides instruction in the basic gestures used in conducting vocal and instrumental ensembles. Topics include beat patterns, conveying phrasing and articulation, cueing, controlling tempo and dynamics, score study, and rehearsal techniques. Provides an opportunity for students enrolled in the course to constitute a laboratory ensemble for regular practicum. *Prereq.* Ability to read music and to sing or play an instrument.

MUS 1261 Music Lessons**1 QH**

Offers private instruction in voice or in an instrument. Arranges lessons on a half-hour or 45-minute basis. Contact the music department for arrangements. Lab fee.

MUS 1265 Jazz Improvisation 1**4 QH**

Focuses on repertoire as well as performance. Examines the great improvisational artists in American music, such as Charlie Parker, Miles Davis, and John Coltrane. Approaches analysis from a theoretical as well as a practical perspective. Explores the use of rhythm, chords, scales, and modes in the creative improvisation process.

MUS 1301 Form and Analysis 1**4 QH**

Examines representative examples of structural principles governing the melodic, harmonic, rhythmic, and formal components of music. Focuses on music from the sixteenth to the mid-nineteenth centuries. *Prereq.* MUS 1204.

MUS 1302 Form and Analysis 2**4 QH**

Continues MUS 1301. Examines works from the late nineteenth century to the present. Includes selected readings by prominent twentieth-century theorists. *Prereq.* MUS 1301.

MUS 1365 Seminar in the Music Industry**4 QH**

Offers advanced students the opportunity to explore contemporary events and issues in the music industry. Expects students to apply and distill knowledge accumulated in prior courses. Gives students the opportunity to develop case studies and engage in actual music industry activities such as producing concerts, managing road tours, promoting records, or planning promotional campaigns for musical merchandise marketing. Offers forums for debate on current controversies and developments in the music industry. *Prereq.* MUS 1166 and junior standing.

MUS 1366 Copyright Law for Musicians**4 QH**

Explores the unique character of music-related copyright issues. Investigates common law copyright; statutory copyright; ownership, duration, and transfer of copyright; fair use; works for hire;

infringements and remedies; public domain works; and international copyright. *Prereq.* MUS 1166 or permission of instructor.

MUS 1367 Computer Applications in Music Business 4 QH

Uses state-of-the-art computer applications in an advanced exploration of the business of music. Investigates computer applications in the record industry, artist management, arts administration, music merchandising, and music publishing. *Prereq.* MUS 1166.

MUS 1421 Historical Traditions 1: American Music 4 QH

Provides an overview of music in the United States in cultural and stylistic contexts. As the first of a sequence of courses for music majors, introduces historical methods of music. Studies a broad range of styles, including folk, popular, and classical musics. *Prereq.* MUS 1107.

MUS 1422 Historical Traditions 2 4 QH

Provides an overview of early Western music, from the middle ages through the seventeenth century in cultural and stylistic contexts. Concentrates on classical music, but will also deal with music as a living language, related to other kinds of music and other arts and made by people for different reasons. Uses scores to help understand the different ways music can be written and the different aesthetic definitions of beauty, pleasure, and meaning in sound. *Prereq.* MUS 1421.

MUS 1423 Historical Traditions 3 4 QH

Provides an overview of eighteenth- and nineteenth-century Western music in cultural and stylistic contexts. Covers some of the best-known figures in classical music: Bach, Mozart, Beethoven, and Wagner. Considers why and how the great tradition of tonal music defines classical music even today. Uses scores to help understand the different ways music can be written and the different aesthetic definitions of beauty, pleasure, and meaning in sound. *Prereq.* MUS 1421.

MUS 1424 Historical Traditions 4 4 QH

Provides an overview of Western classical music in the twentieth century. Concentrates on classical music but also deals with music as a living language related to other kinds of music and other arts and made by people for different reasons. Focuses on both style, often of one great figure, and topic. Looks for parallels between classical music and the other arts and popular musics as well. *Prereq.* MUS 1421.

MUS 1425 Historical Traditions 5 4 QH

Examines the historical musical traditions of selected music-cultures of Africa, Asia, Oceania, and indigenous cultures of the Americas. Provides an in-depth study of the evolution of the selected music-cultures focusing on the following considerations: ethnomusicological historical approaches to the study of music-cultures including music and the belief system, aesthetics, context for music, repertoires, organization of musical sound, instruments and performance techniques, and learning and transmission of musical knowledge (performance and non-performance). Explores why music is different among the world's peoples; what music of the past sounded like, its impact on how music sounds today; what happens to music over time and space; and why music should be preserved and by whom. *Prereq.* MUS 1421.

MUS 1461 Applied Music Lessons 3 QH

Provides advanced individual instruction in voice or on modern and early instruments. May be repeated for credit. Available only

to upperclass students concentrating in music literature and performance. *Prereq.* Permission of instructor and department chair.

MUS 1700 Introduction to Music (Honors) 4 QH

Honors equivalent of MUS 1100.

MUS 1709 Introduction to Music and the Arts (Honors) 4 QH

Honors equivalent of MUS 1109.

MUS 1800, MUS 1801, MUS 1802, MUS 1803, MUS 1804, MUS 1805 Directed Study 4 QH each

Focuses independent work in a selected area of music under the direction of one member of the department. Limits enrollment to qualified students by special arrangement with the supervising faculty member and with the approval of the department chair.

MUS 1810, MUS 1811, MUS 1812, MUS 1813 Junior/Senior Honors Project 4 QH each

For details contact the honors office.

Courses at the New England Conservatory

Qualified students will be able to take selected courses at the New England Conservatory of Music. Regular academic credit will be granted. For information, contact the chair of the department.

Philosophy and Religion

PHL 1100 Introduction to Philosophy 4 QH

Introduces students to philosophy by acquainting them with the theories and arguments of classical and contemporary philosophers and by teaching the skills of constructing and analyzing arguments. Emphasizes philosophical inquiry. Covers typical areas such as questions about the basis of morality, free will versus determinism, the existence of God, the problem of suffering, and the nature of knowledge. (II)

PHL 1110 Introduction to Religion 4 QH

Seeks to identify and appraise different ways of being religious: primitive, mystical, dogmatic, and ritual. Emphasizes appreciating the unique standpoint that each requires, how each sees the world in a radically different way, and how that leads to distinctive ways of life. (II)

PHL 1130 Ethics: East and West 4 QH

Explores claims in both Eastern and Western philosophy that a way of life exists that leads to happiness, power, and wisdom. Studies the thought of such philosophers as Socrates, Buddha, Plato, Aristotle, Lao Tzu, Epictetus, Marcus Aurelius, Aquinas, and Spinoza, as well as by studying some of the classical Hindu and Buddhist texts. (V)

PHL 1135 Philosophical Problems of Law and Justice 4 QH

Focuses on two general questions: What is the proper scope of the law? And how should the law be enforced? Under the first question, deals with a number of issues such as whether the law has a legitimate right to restrict such activities as the use of drugs, deviant sexual practices, or gambling. Under the second question deals with the justification of punishment, rehabilitation as an alternative to punishment, and the death penalty. (VI)

PHL 1140 Social and Political Philosophy**4 QH**

Focuses on basic questions about the nature of the state and the relationship of individuals to the state. What basis is there for individuals to obey the laws of the state? What conditions must a government meet to be legitimate? What justification can be given for democratic forms of government? What sorts of controls should the state exert over citizens? What benefits do citizens have a right to expect from the state? Includes readings from both classical and contemporary sources. (V) *Prereq.* 4 QH *philosophy.*

PHL 1145 Technology and Human Values**4 QH**

Examines the changing values of the modern, technologically advanced world. Attempts to increase our understanding of the supposed breach between the literary and scientific cultures, the diverse approaches toward their reconciliation, and the human dimensions of science and technology. Considers other relevant topics such as the neutrality of technology with respect to good or evil uses, technology as an instrument for human liberation, and the issue of proper and effective modes of controlling technology in today's world. Studies Pirsig's widely read paperback, *Zen and the Art of Motorcycle Maintenance*, as well as Lynn White's *Dynamo* and *Virgin Reconsidered*. Also considers other important writers, including Kurt Baler, Jacob Bronowski, Barry Commoner, Erich Fromm, Karl Marx, and C. P. Snow. (VI)

PHL 1155 The Ethics of Human and Animal Experimentation**4 QH**

Explores the conflicts that arise between the value of free scientific inquiry on the one hand and the rights, vulnerabilities, and suffering of human and animal subjects on the other. Considers traditional issues involving informed consent, voluntariness, coercion, experimental design, risk-benefit analyses, institutional review boards, and professional guidelines, as well as such less traditional issues as the competing conceptions of progress, whether we have obligations to nonhuman animals, and what, if anything, justifies us in treating animals in ways in which we know we should not treat humans. (VI)

PHL 1160 Ethical Issues of Taxation**4 QH**

Explores two basic questions: Is any taxation morally justified? Are there moral grounds for choosing among taxation policies? Covers competing conceptions of private property; the "progressive versus regressive taxation" controversy; the "flat tax" controversy; the alleged problems with interpersonal utility comparisons; and questions involving the distribution of tax monies, e.g., whether those who have more than they need have any moral obligation to provide for the needs of the poor. (VI)

PHL 1165 Moral Problems in Medicine**4 QH**

Examines two fundamental ethical systems, one of which is grounded on the dignity of the person, the other on the intrinsic value of happiness. Then explores the difficult issues of euthanasia, suicide, paternalism, medical experimentation, the patient's right to consent to any therapeutic intervention, and the concept of death with dignity. Examines the larger economic and policy issues of justice, some of which are current in political debates (for example: Is there a right to health care?). Encourages the student to become more sensitive to moral problems as they arise in medical settings, to be better able to deal with these troublesome issues, and perhaps to be more courageous in facing them if that becomes necessary. Also offers an investigation into the questions of abortion, euthanasia, infanticide, genetic counseling,

psychosurgery, and human experimentation from the standpoint of both philosophical ethics (such as the theory of the end justifying the means) and religious ethics (such as the natural-law theory of the Roman Catholic Church). (VI)

PHL 1180 Ecology Ethics**4 QH**

Investigates the Gaia hypothesis, the view that the earth is a self-regulating ecosystem. Focuses on a current ecological crisis, the greenhouse effect, and on one of its major causes, deforestation. Addresses the values that underlie our concern over this and other ecological crises, whether the values at issue are anthropocentric or biocentric. Explores the ethical implications these ecological concerns have for our individual lifestyles, and for our role as members of communities. Explores how we should live as creative, responsible, and fulfilled beings on the planet. (VI)

PHL 1200 Introduction to Logic 1***4 QH**

Introduces the logic of propositions and the syllogism. Examines principles of critical reasoning and fallacies. Provides practice in applying logical techniques to the creation and criticism of argument. (II) *Students with a strong math background should enroll in PHL 1215.*

PHL 1203 Introduction to Logic 2***4 QH**

Continues the study of the techniques of logic in the analysis and creation of argument. Explores the logic of predicates, quantifiers, and relations. Provides practice in applying these techniques to natural arguments. Considers the forms of definition and the evaluation of empirical generalizations. (Overlaps PHL 1215.) (II)

PHL 1215/LIN 1215 Symbolic Logic***4 QH**

Focuses on the syntax and semantics of propositional logic and first order quantification theory. Considers relations between these systems and natural language. Covers analysis of the notion of derivation within a system, the notion of logical consequence, and practice in analyzing logical structure in natural language sentences. (II) *Recommended for students with a strong math background.*

PHL 1225 Ancient Philosophy**4 QH**

Explores classical Greek philosophy; starts with a study/discussion of the roots of Western thought in the sixth century B.C. and argues the reasons for our debt to these original thinkers who were concerned with explaining the principles of external nature and the problems of human knowledge and conduct. Studies Socrates and his adversaries, the Sophists, and the two major figures he influenced: Plato and Aristotle. Also covers Roman philosophy, the Stoics, and the Sceptics, who are a prelude to the early Christian philosophers of the first century A.D. Places attention on the interplay between philosophers and the moral, social, and religious context in which their thought arises. Emphasizes student participation in class discussion. (III)

PHL 1230 Modern Philosophy**4 QH**

Explores the 100 years between 1650 and 1750, sometimes called "the century of genius," a period in which philosophers reacted to the new scientific discoveries of Copernicus, Kepler, and Galileo. Focuses on the development of the rationalist and empirical philosophies during this period, with emphasis on Descartes, Leibniz, Spinoza, Locke, Berkeley, and Hume. (III) *Prereq.* 8 QH *philosophy.*

*Students should take either PHL 1200 and PHL 1203 or PHL 1200 and PHL 1215. Credit will not be given for all three courses.

- PHL 1243 Existentialism** 4 QH
Examines existentialist philosophy in its greatest representatives, such as Kierkegaard, Nietzsche, Dostoevski, Heidegger, Jaspers, and Camus, with major attention given to Jean-Paul Sartre and Maurice Merleau-Ponty. Focuses on central themes, including self-alienation, unauthenticity, authenticity, and existential experiences. Examines existential philosophy in its historical, social, and cultural relations, and in its influence on psychology, psychoanalysis, sociology, political science, and literature, both in Europe and in the United States. *Prereq.* 4 QH philosophy.
- PHL 1245 Analytic Philosophy** 4 QH
Traces the development of the analytic movement from its beginnings in the early works of Moore and Russell. Provides some treatment of Russell's logical atomism, the logical positivists, the thought of Ludwig Wittgenstein, and their widespread influence. *Prereq.* 8 QH philosophy.
- PHL 1255 Indian Philosophy** 4 QH
Examines the two classical Indian philosophical systems of Hinduism and Buddhism. In examining Theravada Buddhism, explores the view that it is possible for us to live without anxiety or suffering if we overcome our ignorance of reality and master our desires. Next, explores Mahayana Buddhism and its ethics of compassion and its related metaphysics of "voidness." In this part of the course, examines questions that, in the West, are thought of as questions about personal identity and the nature of the self. In exploring Hinduism, studies Vedic mysticism as it comes to us through the Upanishads, as well as the influential ethics of the Bhagavad Gita. Examines the question of whether the method of yoga and meditation is a reasonable method for learning about the fundamental nature of reality.
- PHL 1275 Eastern Religions** 4 QH
Explores the fundamental nature of reality. The course first tries to make sense of the difficult notion that the way we perceive reality may be illusory. Examines Theravada Buddhism, a religion that rests on the insights that everything is impermanent and that it is possible to live fully in the present without any suffering. From Theravada Buddhism, the course turns to Mahayana Buddhism, and then to Taoism, a subtle view that emphasizes the "flow" of life and that "the way to do is to be." Next, the Hinduism of the Upanishads is examined. As part of the exploration of this form of Hinduism, students are given the opportunity to examine meditation intellectually and also to practice a few methods of meditation. In addition, the course investigates the devotional aspect of Hinduism as expressed in the Bhagavad Gita. There will also be an exploration of Zen. (IV)
- PHL 1280 Islam** 4 QH
Explores the history of Islam, its past and current conflicts with the West, Islamic beliefs, the future of Islam as a world religion, and relations of Islam with Christianity and Judaism. Examines social, political, and legal issues, as well as with the more familiar religious and theological questions. (IV)
- PHL 1285 Introduction to Jewish Religion and Culture** 4 QH
Explores the basic features of Judaism in the ancient, Rabbinic and Modern periods. Employs an historical critical approach to the formative texts and their interpreters. Analyzes Jewish practices within specific historical contexts and discusses the ways in which practices relate to the texts and history of Judaism. Examines the rich varieties of Jewish cultural expressions.
- PHL 1290 Cults and Sects** 4 QH
Examines the varieties of religious experience from the perspectives of sociology and psychology of religion. Focuses on such cultic and sectarian groups as Christian Science, the American Shakers, the Unification Church, the Hare Krishna movement, and the Black Muslims. Provides the student the opportunity to acquire critical investigative tools with which to analyze different religious expressions.
- PHL 1293 Eastern and Nontraditional Philosophy** 4 QH
Offers an inquiry into the comparative study of the writings of Christian, Buddhist, Hindu, and nontraditional philosophers and mystics. Topics include the potential oneness of the human and God, the conflict of mystics and traditional forms of philosophy, and the possibility of a common, cross-cultural basis for philosophy.
- PHL 1295 Medicine, Religion, and the Healers' Art** 4 QH
Explores aspects of the historical, religious, and cultural context for contemporary alternatives in health care, beginning with an examination of several examples of traditional healing practices and their accompanying religious and philosophical views about human life. Explores this "holistic" tradition in two frames of reference: the ascendancy of scientific rationalism over religion and the takeover, by male-dominated professions, of healing functions that society has traditionally assigned to women (e.g., the rise of obstetrics and the suppression of midwifery). Gives special attention to major women healers of the nineteenth century. Looks at some contemporary efforts at reintegration of scientific and traditional values in the modern health care system. Gives students the opportunity to meet and interact with patients and healers active in the modern holistic health movement.
- PHL 1315 Understanding the Bible** 4 QH
Introduces students to the Old and New Testaments, so that they can enter into a dialogue with the Bible, understanding not only what it says, but why it is said that way. Focuses on the Bible's social, political, and cultural backgrounds. (III)
- PHL 1320 The Meaning of Death** 4 QH
Offers an inquiry into different philosophical and religious perspectives on death and life after death, including an examination of some powerful contemporary accounts of personal confrontation with death, along with investigations into attitudes toward death in other traditions for example, Hinduism and Buddhism. In addition, explores responses to the Holocaust in Europe and theories about life after death (such as those discussed in Raymond Moody's *Life After Life* and Ian Stevenson's *Reincarnation*). (V)
- PHL 1335 Moral Philosophy** 4 QH
Explores two basic questions: What sorts of things are good and bad? What actions are right and wrong? Covers major classical conceptions of ancient Greece and Rome, their replacement by the Western religious ethic, its modification and rejection in the early modern period, and the emergence of modern versions of traditional conceptions of the good life, with reflections on the nature of ethical inquiry itself as a legitimate study. *Prereq.* 4 QH philosophy or religion or permission of instructor.
- PHL 1340 Aesthetics** 4 QH
Offers a historical approach to aesthetics, the philosophical analysis of concepts and the solution of problems that arise when one contemplates beautiful (or ugly) objects. Also explores standards of value in judging art by asking the following questions:

What features make objects beautiful (or ugly)? Are there aesthetic standards? What is the relation of works of art to nature? What is the nature of an aesthetic experience? *Prereq.* 4 QH philosophy.

PHL 1345 Philosophy of Religion 4 QH

Asks the basic question, "Does God exist?" Examines several major arguments affirming and criticizing the notion of God's existence. Explores a central problem in recent philosophy of religion of whether or not it makes any sense to speak of the truth (or falsity) of religious belief, as well as the implication an answer to that issue has for religious life. *Prereq.* 4 QH philosophy.

PHL 1350 Philosophy of Human Nature 4 QH

Offers a philosophical inquiry into the theories of man, man's dimensions, and human nature. Examines the question of the existence of human nature. Pays special attention to contemporary theories of man and self-alienation and their influence in social sciences. Includes selected readings from Descartes, Hobbes, Hegel, Marx, Kierkegaard, Maritain, Freud, Skinner, Fromm, and Frankl.

PHL 1360 Philosophy and Literature 4 QH

Provides the student the opportunity to learn to recognize, appreciate, and criticize philosophical themes in literature. Includes readings from acknowledged classics by philosophical authors such as Voltaire, Dostoevski, and Sartre; popular contemporary authors such as Vonnegut, Barth, and Pynchon; and readings from more straightforward philosophical sources. Examines the meaning of life, the human condition, depersonalization, alienation, human freedom, questions of value, responsibility, rationality, and personal identity. Explores religious, nihilistic, existential, and other viewpoints.

PHL 1370 The Meaning of Life 4 QH

Examines selected philosophical problems of human existence in the contemporary world, with major emphasis on the search for identity and self-fulfillment. Discusses selected problems such as freedom, death, sexuality, alienation, becoming a person, and peak experiences. Includes readings from Kierkegaard, Heidegger, Sartre, Camus, Maslow, Allport, Frankl, Rogers, and Rollo May.

PHL 1375 Freud, Skinner, and Their Critics 4 QH

Examines fundamental themes and concepts of Freud's psychoanalysis and Skinner's psychology from a philosophical perspective and criticisms of them from the point of view of reformed Freudians and existentialists. Includes selections from Freud, Jung, Adler, Karen Horney, Skinner, Koestler, Pearls, Sartre, Merleau-Ponty, and Kovaly. *Prereq.* 4 QH philosophy or permission of instructor.

PHL 1400 Theory of Knowledge 4 QH

Introduces epistemology, or theory of knowledge, which asks the following questions: What is knowledge? Is knowledge (or even certainty) attainable? What are the limitations of human knowledge? How is knowledge—if we have it—acquired? What roles do reason and experience play in the attempt to attain knowledge? Studies both classical (Rene Descartes and David Hume) and contemporary sources (Bertrand Russell and others). Examines and criticizes various theories of knowledge, such as empiricism, rationalism, and skepticism. Encourages students to form at least tentative opinions on these issues. *Prereq.* 4 QH philosophy or permission of instructor.

PHL 1405 Metaphysics 4 QH

Considers central problems and theories concerning the nature of reality, with special attention to such areas as the relation between mind and matter, free will and determinism, and criteria of existence. *Prereq.* 8 QH philosophy.

PHL 1410 Philosophy of Science 4 QH

Focuses on the nature of scientific method, scientific theories, and scientific explanations. Examines the central question of why science is thought to provide the most reliable account of the nature of reality. Considers various theories about the nature and reliability of science. *Prereq.* 4 QH philosophy.

PHL 1415 Advanced Logic 4 QH

Studies the major results in the meta-theory of first order logic. Examines consistency, completeness, and decidability. Discusses the general notion of an effectively computable process, Church's thesis, and the existence of unsolvable problems. *Prereq.* PHL 1215.

PHL 1435 Philosophy of Mind 4 QH

Seeks to show what puzzles and problems result from an honest attempt to answer these questions in a reasonable way: What is the relation between mind and body? Is the mental merely a function of bodily process and behavior, or does it somehow exist "over and above" the material? How are self-knowledge and knowledge of other minds achieved? What is the relation between words and thoughts? Examines classical sources, such as Descartes and Locke, and contemporary sources, such as Wittgenstein and Putnam. Also seeks to arrive at some answers—however tentative or provisional—to these questions. Constantly challenges the student to think and write well about these difficult subjects. *Prereq.* 4 QH philosophy.

PHL 1440/LIN 1440 Philosophy of Language 4 QH

Examines prospects for a theory of language, its syntax, and its semantics. Examines contrasts between theory of reference and theory of meaning. Asks whether there are universals of language. Analyzes relations between linguistics and psychology. Includes readings from Frege, Quine, Russell, Chomsky, and Fodor. *Prereq.* Permission of instructor.

PHL 1550, PHL 1551, PHL 1552, PHL 1553 4 QH each

Junior/Senior Honors Project

For details contact the honors office.

PHL 1700 Introduction to Philosophy (Honors) 4 QH

Honors equivalent of PHL 1100.

PHL 1720 The Meaning of Death 4 QH

Honors equivalent of PHL 1320.

PHL 1740 Social and Political Philosophy (Honors) 4 QH

Honors equivalent of PHL 1140.

PHL 1800 Directed Study 4 QH

Those interested in the directed study program should meet with the department chair. *Prereq.* permission of instructor.

PHL 1888 Great Philosophers Seminar 4 QH

Focuses on the writings of a major philosopher. Subjects include Plato, Aquinas, Locke, Hegel, and Heidegger. *Prereq.* 12 QH of philosophy courses.

PHIL 1890 Seminar in Religion**4 QH**

Examines topics including theodicy, cosmogeny, contemporary issues in religion, and comparative ethics. *Prereq.* 12 QH of philosophy and religion courses.

PHL 1891 Major Figures in Religious Studies**4 QH**

Focuses on the work of one figure important in the field of religion. Subjects include Augustine, Calvin, Luther, Weber, and Eliade. *Prereq.* 12 QH of religious studies.

PHL 3265 Issues in Medical Ethics**4 QH**

Focuses on issues in medical ethics, especially as they are likely to arise in a clinical setting. Begins with exploration of the two basic systems of ethical theory and then concentrates on their application in cases exemplifying the issues of euthanasia, paternalism, experimentation, informed consent, quality of life, professional responsibility, right to health care, truth telling, genetic control, abortion, and the allocation of scarce medical resources. *Prereq.* Permission of instructor.

Physics

Courses are listed according to level and degree of specialization. General interest courses have no prerequisites and may be used to satisfy College of Arts and Sciences distribution requirements in science. Introductory physics courses are basic first-year physics lecture courses; the corresponding labs are listed under "Introductory Physics Laboratories." Advanced physics and astronomy courses require one year of introductory physics and may be used to satisfy degree requirements for physics majors.

General Interest Courses

PHY 1111 Introduction to Astronomy I**4 QH**

Offers the nonscience student an introduction to modern astronomical ideas. Includes such topics as introduction to the cosmos; tools of the astronomer (atoms, the nature of light and radiation, telescopes, space astronomy); the earth in space; our solar system (origin and future of the solar system, the planets and other bodies, the latest from spacecraft flights, the sun as our bridge to the stars); the question of life in the universe. (II)

PHY 1121 Introduction to Science I**4 QH**

Provides for nonscience majors an interdisciplinary treatment of the basic ideas of the natural sciences. Discusses concepts such as energy, gravity, and the atom, followed by a consideration of the ways in which atoms combine to form the substances that comprise matter. (II)

Introductory Physics Courses

PHY 1191 Physics for BSET 1**4 QH**

Focuses on units and scientific notation, force, Newton's first law, static equilibrium, Newton's second law, momentum, work, kinetic energy, potential energy. *Prereq.* MTH 1191, which may be taken concurrently; BSET majors only.

PHY 1192 Physics for BSET 2**4 QH**

Focuses on power, rotational motion, Pascal's law, hydrostatic pressure, molecular mass, ideal gas law, first and second laws of thermodynamics, simple harmonic motion, wave motion, sound, and light. *Prereq.* PHY 1191; MTH 1192, which may be taken concurrently; BSET majors only.

PHY 1193 Physics for BSET 3**4 QH**

Focuses on electrostatics, circuit elements, direct current circuits, magnetism, electromagnetic induction, electromagnetic waves, atomic and nuclear physics. *Prereq.* PHY 1192; BSET majors only.

PHY 1201 Physics for the Life Sciences 1**4 QH**

Focuses on vector addition of force, principles of statics; Newton's second law, kinetic and potential energy; pressure static properties of fluids, fluid flow. To take the lab for this course, register for PHY 1501 concurrently. (II)

PHY 1202 Physics for the Life Sciences 2**4 QH**

Focuses on wave motion, sound, light, optics, static electricity, DC circuits, magnetism. To take the lab for this course, register for PHY 1502 concurrently. (II) *Prereq.* PHY 1201.

PHY 1203 Physics for the Life Sciences 3**4 QH**

Focuses on temperature, gas laws, properties of liquids (surface tension and osmotic pressure), properties of solids, thermal physics, Coulomb's law, and atomic and nuclear physics. *Prereq.* PHY 1202.

PHY 1221 Physics for Science and Engineering Students 1**4 QH**

The first quarter of a four quarter sequence intended primarily for science and engineering students, covers mechanics, kinematics, dynamics, Newton's laws, work, energy, linear momentum, collisions, and rotations. *Prereq.* MTH 1123 or equivalent, which may be taken concurrently.

PHY 1222 Physics for Science and Engineering Students 2**4 QH**

Continues PHY 1221. Focuses on rotation equilibrium, angular momentum, harmonic motion, fluid mechanics, wave motion, sound, and optics. *Prereq.* PHY 1221 and MTH 1124 or equivalent, which may be taken concurrently.

PHY 1223 Physics for Science and Engineering Students 3**4 QH**

Focuses on electricity, electric fields, electric potential, Ohm's law, simple circuits, magnetic fields, Faraday's law and induction, and Maxwell's equations. *Prereq.* PHY 1222 and MTH 1125 or equivalent, which may be taken concurrently.

PHY 1224 Physics for Science and Engineering Students 4**4 QH**

Focuses on physical optics, special relativity, photoelectric effect, Compton scattering, and quantum mechanics (including the uncertainty principle, the Schrodinger equation, wave functions, the hydrogen atom, solids, nuclear and atomic physics). *Prereq.* PHY 1221, PHY 1222, and PHY 1223 or equivalent.

PHY 1252 Physics Review**1 QH**

Offers a calculus-based review for students who have had previous college physics courses not equivalent to the engineering sequence of PHY 1221 through PHY 1224. Covers fundamentals of mechanics, electricity, and magnetism. *Prereq.* One year of college physics and knowledge of elementary calculus.

Introductory Physics Laboratories

PHY 1196 Physics BSET Laboratory 1**1 QH**

Covers experiments from various physics topics covered in PHY 1191. Lab fee. *Prereq.* PHY 1191 concurrently; BSET majors only.

PHY 1197 Physics BSET Laboratory 2**1 QH**

Covers experiments from various physics topics covered in PHY 1192. Lab fee. *Prereq.* PHY 1196; PHY 1192 concurrently; BSET majors only.

PHY 1198 Physics BSET Laboratory 3**1 QH**

Covers experiments from PHY 1193. Lab fee. *Prereq.* PHY 1193 concurrently; BSET majors only.

PHY 1501 Physics Laboratory for the Life Sciences 1**1 QH**

Accompanies PHY 1201. *Prereq.* PHY 1201 concurrently.

PHY 1502 Physics Laboratory for the Life Sciences 2**1 QH**

Accompanies PHY 1202. *Prereq.* PHY 1501; PHY 1202 or PHY 1203 concurrently.

PHY 1521 Physics Laboratory for Science and Engineering Students 1**1 QH**

The first of a two-quarter lab sequence in which the student performs experiments from various fields of physics. PHY 1221 concurrently.

PHY 1522 Physics Laboratory for Science and Engineering Students 2**1 QH**

Continues PHY 1521. *Prereq.* PHY 1521; PHY 1222 concurrently.

PHY 1533 Physics Laboratory for Science Majors 3**1 QH**

Focuses on lab experiments related to topics covered in PHY 1233. *Prereq.* PHY 1522; PHY 1223 concurrently.

Advanced Physics and Astronomy Courses**PHY 1301 Intermediate Mechanics****4 QH**

Focuses on classical mechanics in two and three dimensions; a review of Newton's laws; special emphasis on conservation theorems for energy, momentum, and angular momentum; harmonic and wave motion. *Prereq.* PHY 1232 and PHY 1233; MTH 1243 concurrently.

PHY 1302 Electric and Magnetic Fields**4 QH**

Focuses on the basic concepts of electric and magnetic fields, including electric and magnetic fields in free space and materials; Maxwell's equations in integral form. *Prereq.* PHY 1301; MTH 1244 concurrently.

PHY 1303 Modern Physics**4 QH**

Reviews experiments demonstrating the atomic nature of matter, the properties of the electron, the nuclear atom, the wave-particle duality, spin, and the properties of elementary particles. Discusses, mostly on a phenomenological level, such subjects as atomic and nuclear structure, properties of the solid state, and elementary particles. *Prereq.* PHY 1224 and PHY 1233 or equivalent.

PHY 1304 Mathematical Physics**4 QH**

Reviews linear algebra and vector calculus, special functions and partial differential equations of physics, potential theory, functions of a complex variable. *Prereq.* MTH 1244 and PHY 1233; MTH 1246 concurrently.

PHY 1305 Thermodynamics and Kinetic Theory**4 QH**

Focuses on first and second laws of thermodynamics, entropy and equilibrium, thermodynamic potentials, elementary kinetic theory, statistical mechanics and the statistical interpretation of entropy. *Prereq.* PHY 1224 or PHY 1233, and MTH 1244.

PHY 1401 Classical Mechanics**4 QH**

Covers advanced topics in classical mechanics, including vector kinematics, harmonic oscillator and resonance, generalized coordinates, Lagrange's equations, central forces and the Kepler problem, rigid body motion. *Prereq.* PHY 1301 and MTH 1245.

PHY 1402 Electricity and Magnetism 1**4 QH**

Covers Maxwell's equations and their experimental basis, electrostatics and magnetostatics, the electromagnetic field in empty space, electromagnetic waves. *Prereq.* PHY 1302 and PHY 1304 or equivalent.

PHY 1403 Electricity and Magnetism 2**4 QH**

Continues PHY 1402. Focuses on energy and momentum in the electromagnetic field, electrodynamics, the interaction of matter and the field, radiation. *Prereq.* PHY 1402 or equivalent.

PHY 1404 Wave Motion and Optics**4 QH**

Focuses on harmonic and coupled oscillators, wave equation; geometrical and physical optics; interference, diffraction, optics of solids, amplification of light; and lasers. *Prereq.* PHY 1302.

PHY 1411 Introduction to Astrophysics and Cosmology**4 QH**

Introduces the student to current ideas in astrophysics and cosmology, with emphasis on recent advances in this field. Focuses on tools of the astronomer (gamma-, X-, UV-, optical-, infrared-, radio-telescopes, spectroscopes, spacecrafts, and so on); solar system; stellar properties (site luminosity); stellar spectra; Hertzsprung-Russell diagram; stellar energy sources (gravitational, nuclear); evolution of stars (birth, main sequence, red giants, white dwarfs, planetary nebulae, supernovae, neutron stars and pulsars, black holes and gravitational collapse); methods of interstellar and intergalactic distance measurement; our Milky Way galaxy; extragalactic objects (galaxies, clusters of galaxies, radio galaxies, quasars); cosmology (Olber's paradox, recession of galaxies, big bang theory, cosmic background radiation, formation of galaxies, the future of the universe). *Prereq.* Three quarters of elementary physics.

PHY 1413 Introduction to Nuclear Physics**4 QH**

Focuses on nuclear structure, nuclear masses, radioactivity, nuclear radiation, interaction of radiation and matter, detectors, fission, nuclear forces, elementary particles. *Prereq.* PHY 1303.

PHY 1414 Introduction to Solid State Physics**4 QH**

Offers a semiclassical treatment of the thermal, magnetic, and electrical properties of crystalline solids. Examines X-ray diffraction and the reciprocal lattice, elasticity and lattice vibrations, specific heat, properties of insulators, magnetism in insulators and metals, and introduction to the band theory of metals. *Prereq.* CHM 1383 or PHY 1303; and PHY 1305 or equivalent.

PHY 1415 Quantum Mechanics 1**4 QH**

Focuses on observation of macroscopic and microscopic bodies, the uncertainty principle, wave-particle duality, probability amplitudes, Schrodinger wave theory, and one-dimensional problems. *Prereq.* CHM 1383 or PHY 1303; and PHY 1304 or equivalent.

PHY 1416 Quantum Mechanics 2**4 QH**

Continues PHY 1415. Covers discrete and continuous states, Schrodinger equation in three dimensions, angular momentum, general theory of quantum mechanics, applications. *Prereq.* PHY 1415.

PHY 1551 Electronics for Scientists 1**4 QH**

With PHY 1552, forms a two-quarter sequence covering electronic techniques for experimental research in many different fields of science. Focuses on principles of semiconductor devices; analog techniques (amplification, feedback, integration); digital techniques (counting, multiplexing, logic); design of electronic subsystems (analog-to-digital converters, phase-sensitive detectors, data-logging systems); understanding specifications of commercial electronic equipment. In lab examples, makes use of up-to-date integrated and discrete devices such as are currently used in the electronic industry.

PHY 1552 Electronics for Scientists 2**4 QH**

Continues PHY 1551. *Prereq.* PHY 1551.

PHY 1555 Wave Laboratory**4 QH**

Offers a general treatment of the problems of mechanical and electromagnetic radiation as wave phenomena. Focuses on the differential wave equation and its application to selected topics; interference and diffraction theory from the standpoint of the Huygens-Fresnel and Kirchhoff formulations; selected experiments in acoustics, optics, and microwaves to illustrate these problems. *Prereq.* PHY 1224 or PHY 1302.

PHY 1557 Advanced Physics Laboratory**4 QH**

Presents special projects in modern experimental physics, including electronic instrumentation used in measuring physical quantities and use of microprocessors. *Prereq.* PHY 1551 and PHY 1552.

PHY 1561 Project Laboratory**4 QH**

Allows students to select and carry out individual projects involving instrumentation and computation. Involves the development of some aspect of instrumentation and/or computation in an ongoing research project and the preparation of a final report. The student will be supervised by the project leader and the course instructor. (Although the course carries 4 QH credit, it is taken in successive winter and spring quarters.) *Prereq.* Permission of instructor.

PHY 1711 Introduction to Astronomy 1 (Honors)**4 QH**

Honors equivalent of PHY 1111.

PHY 1721 Physics 1**4 QH**

Honors equivalent of PHY 1221.

PHY 1722 Physics 2**4 QH**

Honors equivalent of PHY 1222.

PHY 1723 Physics 3**4 QH**

Honors equivalent of PHY 1223.

PHY 1724 Physics 4**4 QH**

Honors equivalent of PHY 1224.

**PHY 1885, PHY 1886, PHY 1887, PHY 1888
Junior/Senior Honors Project****4 QH each**

For details contact the honors office.

Political Science

POL 1110 Introduction to Politics**4 QH**

Offers an overview of basic concepts such as power, authority and sovereignty, methods of political analysis, and contemporary political ideologies. Discusses such dynamics as political culture, public opinion and participation, and political systems. (II)

POL 1111 Introduction to American Government**4 QH**

Analyzes the American system of government and politics. Includes the philosophical origins and design of the Constitution, public opinion, political behavior and participation, parties and interest groups, and formal governmental institutions. May cover cases in domestic and foreign policymaking. (II)

POL 1112 Introduction to International Relations**4 QH**

Applies basic theories of international relations to examining the foreign policies of the key actors in the international system. Covers topics of international aid, trade, and monetary affairs; issues relating to the arms race, nuclear proliferation, arms control, and disarmament; international law and organizations, human rights, and the impact of technology on the functioning of the international system. (II)

POL 1113 Introduction to Foreign Governments**4 QH**

Presents a comparative study of political organization and behavior in selected countries. Includes such topics as political economy, leadership, political institutions, political culture, and political participation.

POL 1114 The United States Constitution**4 QH**

Introduces the U.S. Constitution by exploring its theory, its origin, and the institutions by which it bestows and restrains power. Surveys the constitutional liberties guaranteed. Examines what this fundamental supreme United States law means today, two centuries after its ratification. Other topics include congressional areas of policy-making responsibility, presidential power, the role of the judiciary in the American system of government, and the reconciliation of majority rule with minority rights.

POL 1260 Public Policy Analysis**4 QH**

Uses both theoretical literature and case studies to analyze the structure of and dynamics inherent in the American policymaking process. Introduces such concepts as problem definition, agenda-development, policy formation, implementation, and program evaluation. Examines basic policy analysis methods. (VI)

POL 1261 Public Administration**4 QH**

Provides a broad overview of the administrative aspects of public policies and programs. Topics include public management, organizations, budgeting, personnel administration, and program evaluation.

POL 1262 Bureaucracy and Government Organizations**4 QH**

Examines the general principles underlying the structures, processes, and operation of public organizations. Looks at the role of bureaucracies within the larger political system, as well as how public agencies develop and change over time.

POL 1266 Public Personnel Administration**4 QH**

Presents an overall introduction to the field of public personnel administration. Examines selected topics such as recruitment, selection, classification, case development, equal opportunity, public employee unionism, and collective bargaining. *Prereq.* POL 1261.

POL 1267 Politics of Budgeting and Taxation**4 QH**

Focuses on the function of budgeting in a variety of governmental contexts, specifically, the appropriations process, the budget as a management tool, and the public policy impacts of the budget. Emphasizes budgeting techniques within this context. *Prereq.* POL 1261.

POL 1301 Research Methods 1**4 QH**

Offers an introduction to the principal quantitative methods used in political analysis, public administration, political behavior, international relations, and policy sciences. Emphasizes basic statistical techniques, survey methods, and SPSS programming. *Prereq. Middler standing or above, or permission in instructor. Prior completion of college mathematics requirement also necessary.*

POL 1302 Research Methods 2**4 QH**

Focuses on methods of quantitative analysis. Covers the following primary statistical topics: significance testing, bivariate regression and correlation, and multiple regression and correlation. In addition, teaches elementary computer skills and the use of the programming language Statistical Package for the Social Sciences (SPSS) to calculate advanced statistics. Emphasizes the practical application and understanding of statistical techniques by providing numerous examples in the areas of political behavior, public opinion, and public policy analysis. *Prereq. POL 1301 and middler standing or above, or permission of instructor. Prior completion of college mathematics requirement also necessary.*

POL 1303 Political Behavior**4 QH**

Examines selected topics in contemporary political science from a political behavior perspective. Focuses on political attitude formation and change, ideology, socialization, public opinion and voting behavior, political campaigning, political violence, and empirical democratic theory.

POL 1304 Practical Politics**4 QH**

Accentuates and systematically treats some of the problems of organizing for effective citizen action, partisan and nonpartisan, at the grass-roots level. Explores roles in political campaigning.

POL 1306 Politics in Western Europe**4 QH**

Offers a comparative survey of the societies, economies, and political systems in the democracies of Western Europe. Examines governing structures and major political developments within the major European states, as well as major policy issues (e.g., nationalism, federalism, environmentalism) and issues of European integration within the European Union. (III)

POL 1308 The Politics of Poverty**4 QH**

Explores what is referred to as the poverty system: how and why there is poverty, how it affects people's lives, and how it can be eliminated. As a discussion-centered course, relies on simulations, small-group work, and experience-based learning; examines the relations between poverty, racism, and the economic, political, and administrative systems. Evaluates a number of alternatives and provides an opportunity for clarifying individual assumptions and feelings about poverty.

POL 1309 International Political Economy**4 QH**

Focuses on international political and economic relations. Examines how nations interact in such areas as trade, finance, and labor relations. Includes such topics as the International Monetary Fund, multinational corporations, economic sanctions, military interventions, technology transfer, and foreign aid. *Prereq. A course in either economics or international politics is recommended, but not required.* (V)

POL 1310 American Ideology**4 QH**

Analyzes the main American ideologies, including liberalism, neoliberalism, conservatism, neoconservatism, and nationalism.

Examines the historic roots of each ideology and its impact on American politics. Explores the ongoing interaction of political ideology and the political process in contemporary American society. (V) *Prereq. Middler standing or above, or permission of instructor.*

POL 1312 Politics and the Mass Media**4 QH**

Analyzes several facets of the mass media: the role of newspapers, radio, and television in public opinion formation; their use and effectiveness in political campaigns; their objectivity and/or bias in reporting the news; their impact on political parties and the distribution of power between Congress and the President.

POL 1313 International Organizations**4 QH**

Focuses on the development of roles played by international governmental organizations, examining their dual roles as collections of sovereign states and as political actors in their own right. Analyzes the structure and functions of such global organizations as the United Nations as well as regional organizations like the European Union and Organization of American States.

POL 1314 Interest Groups and Public Policy**4 QH**

Surveys the roles of organized interests in American public policy-making. Examines why groups are formed, how they work, why they succeed or fail, and what cumulative impacts groups have on policy. Spans a variety of groups, from traditional economic interests to social movements, public interest organizations, and professional lobbyists.

POL 1316 Contemporary Revolutionary Politics**4 QH**

Examines revolution as a political option and revolutionary movements throughout the world today. Examples will be taken from Marxism-Leninism (e.g., Bolshevik Russia, China, Cuba), revolutionary Islam (e.g., Iran, Algeria), and the anti-Communist forces in the former Soviet Union and eastern Europe. Examines the perennial conflict between revolution as an ideal and regime consolidation as a necessity.

POL 1317 Law and Society**4 QH**

Examines the sociological understanding of legal phenomena. Places special emphasis on the role of law in promoting cultural and social cohesion in American society.

POL 1318 State and Local Government**4 QH**

Introduces students to the political and administrative context of state and local government and surveys the structure, function, and politics of states and localities within the context of the United States federal system. *Prereq. POL 1111.*

POL 1319 Government and Politics of Massachusetts**4 QH**

Emphasizes the political and administrative aspects of government in Massachusetts. Considers the structure and functions of state government as well as major policy problems confronted by public officials. Analyzes the relationship between state and local governments in Massachusetts. *Prereq. POL 1111.*

POL 1320 Parties and Elections**4 QH**

Analyzes political parties and the American system of elections. Focuses on structural and constitutional biases, the organizational aspects of the parties, mass voting behavior, the impact of elections on public policymaking, and national and state historical trends.

- POL 1322 World Politics** 4 QH
Emphasizes various principles, techniques, and patterns that governments have followed to implement their goals or objectives. Uses a case study approach, with an emphasis on the problems associated with the Middle East analyzed from the United States-Soviet and Arab-Israeli viewpoints.
- POL 1324 Urban Politics** 4 QH
Analyzes the political, administrative, economic, and social dynamics of urban areas from a historical perspective.
- POL 1327 Gender Politics** 4 QH
Explores the relation between what is and what ought to be—and why—in the roles of women in American politics. Examines the traditional roles of women in politics, the suffrage movement, the woman as citizen and voter, the role of sex in achieving power and in political efficacy, and the place of women in “new politics.” Also covers political action to promote women’s issues and modern feminism. (VI)
- POL 1329 American Social Welfare Policy** 4 QH
Introduces social welfare policy, with emphasis on programs and services in the contemporary United States. Discusses theoretical frameworks for analyzing social welfare policy; then focuses attention on the substantive areas of welfare, mental health, and social security. Explores various issues and processes related to the design, administration, and implementation of social welfare policy in the context of the American socio-political system. Focuses on social welfare policymaking under the Reagan administration.
- POL 1331 Science, Technology, and Public Policy** 4 QH
Considers the effects of science and technology on politics and policymaking in America and how politics influences science and technology. Focuses on the differences between scientific and democratic values and definitions of rationality, the nature of public problems, and why some problems are easier to “solve” than others. Particularly looks at such issues as nuclear power, recombinant DNA, abortion, and medical research; addresses the question of who should decide such complex matters. (VI)
- POL 1332 Government and Politics of Japan** 4 QH
Focuses on the development of Japan’s political system since World War II. Examines Japan’s political institutions and practice of democracy in the context of its political culture; the interrelationship between business and government; Japan’s foreign policy; and business practices and organization. Raises issues concerning Japan’s extraordinary economic success and the limitations of Japan as a model for other countries. (IV) *Not open to freshmen.*
- POL 1334 Environmental Policy & Politics** 4 QH
Examines the policy-making processes, historical and socio-economic factors, political forces, governmental institutions, and global trends that shape environmental policy at national and sub-national levels in the United States. Gives attention to a wide range of environmental policy areas, with comparisons made between the United States and other nations.
- POL 1335 The American Presidency** 4 QH
Examines the presidential electoral process and the constitutional and extraconstitutional powers of the American President. Studies presidential leadership styles and analyzes the relationship between the executive branch and Congress, the Court, the bureaucracy, and the media.
- POL 1336 American Constitutional Law** 4 QH
Employs excerpts of United States Supreme Court decisions and other reading materials to analyze some of the theoretical, structural, and substantive issues inherent in and relevant to the American constitutional system. *Prereq.* POL 1111 and junior or senior standing.
- POL 1337 United States Foreign Policy** 4 QH
Examines formulation and conduct of foreign policy and the United States since World War II.
- POL 1338 Religion and Politics** 4 QH
Explores the role of religion in domestic and international politics. Examines religion as a source of political tension and strife. Draws examples from the United States and the developing world. Covers Islamic fundamentalism in African and the Near East, Orthodox Jewish parties in Israel, Catholic liberation theology in Latin America, and Protestant fundamentalism and the religious right in America.
- POL 1339 Current Political Issues** 4 QH
Analyzes the constitutional and political background of selected contemporary public issues. Primarily for nonpolitical science majors.
- POL 1340 Crisis and Change in Central/Eastern Europe** 4 QH
Studies the rejection of communist party rule in the six former Soviet bloc socialist countries, Albania, and Yugoslavia and examines political, economic, social, and international problems of post-communist development.
- POL 1342 Government and Politics of Africa** 4 QH
Using films, maps, news clips, discussions, and readings, explores contemporary politics in African nations south of the Sahara. Studies South Africa, Nigeria, Kenya, and Ethiopia, among others. Examines apartheid, colonialism, Afro-Marxism, chieftaincy, development, and Pan-Africanism. Same as AFR 1342. (VI)
- POL 1343 Politics and Violence in Northern Ireland** 4 QH
Analyzes the causes of violence in Northern Ireland. Considers historical, sociological, and economic roots of the conflict, but places major emphasis on politics. Also discusses the international dimension (the roles of southern Ireland, the United States, and so on), paramilitary organizations, legal political parties and groups, and the peace process. Draws comparative parallels, including possible lessons for the United States. (IV)
- POL 1345 Government and Politics in the Middle East** 4 QH
Approaches the political, economic, military, and ideological factors within the Arab states and Israel, inter-Arab politics, the Arab-Israeli conflict, and the great power rivalry in the region. (VI)
- POL 1346 Gender, Family, and Politics in the Middle East** 4 QH
Surveys the roles that gender and family play in political, economic, and social issues of the Middle East. Focuses on several political systems to provide a view of the diversity and similarity between various governments and societies. Topics include women in development; the connection between family and political power; women and Islam; legal status of women; and women in liberation movements. *Prereq.* POL 1345 or INT 1150/HST 1490 or permission of instructor.

POL 1347 Russian Politics After Communism**4 QH**

Presents an analysis of the roots of the collapse of the Soviet Union in 1991 and studies problems of political development after communism. Emphasizes the introduction of democracy, the movement toward a market economy, the reorganization of the military, and the control of inter-ethnic strife.

POL 1348 Russian Foreign Policy**4 QH**

Presents an analysis of the goals, methods, and achievements of Russian policy in the post-Soviet era toward Eastern Europe, Western Europe, the Middle East, Central and East Asia, and the United States, against the background of Soviet behavior toward these areas in the recent past.

POL 1350 American Legislative Process**4 QH**

Explores the structures, dynamics, and styles inherent in public policymaking within the U.S. Congress. Focuses on elections; representation of constituents' interests; the roles played by members, the president, interest groups, and other actors; and how all of this is affected by the structure of Congress and the processes embedded in the legislative body.

POL 1351 Techniques and Practices of Public Management**4 QH**

Focuses on practical skills and techniques of public management. Employs the case method in examining typical management problems at different levels of government. Also covers time and resource management for public sector managerial personnel.

POL 1353 Law and Personal Morality**4 QH**

Examines the use of political power to enforce standards of personal morality and behavior in contemporary American society. Considers such subjects as pornography, sexual privacy and expression, Sunday closing laws, abortion, and prostitution.

POL 1355 Ethnic Conflict**4 QH**

Analyzes the causes and consequences of ethnic political violence in the contemporary world. Examines selected cases based on their importance and their usefulness for understanding ethnic conflict (such as Bosnia, Canada, Northern Ireland, and states of the former Soviet Union). Considers various policies for preventing and resolving ethnic political violence. (VI)

POL 1362 Civil Liberties**4 QH**

Uses United States Supreme Court decisions and other reading material to examine the substantive and procedural guarantees of the Bill of Rights and the Fourteenth Amendment and their relation to a liberal democratic society.

POL 1364 Business and Government Relations**4 QH**

Surveys the relation between economic developments and political processes in the United States. Considers government planning of the economy, monopoly and government regulation, government programs to promote social welfare, and the impact of Federalism on the political-economic system, among other topics.

POL 1368 Government and Politics of Latin America**4 QH**

Examines the governmental systems, political parties, socio-economic problems, and foreign policies of Latin American states. Focuses on political change. (IV)

POL 1369 Political Violence**4 QH**

Analyzes political violence in its various contemporary forms (for example, revolution, genocide, political terrorism, military overthrows, and war). Assesses the causes and consequences of political violence (from both practical and moral points of view) and considers strategies for preventing and resolving political violence.

POL 1371 Government and Politics of China**4 QH**

Focuses on China's political system during Communist party rule. Addresses fundamental issues that the government has been unable to resolve successfully including leadership recruitment and succession; economic growth; class and class struggle; political culture and the educational system; the nature of socialist democracy and socialist legality; and the appropriate form of socialism for a country wishing to modernize rapidly. Examines the interaction among ideology, development, and culture on these issues. (IV) *Prereq.* *Sophomore standing or above.*

POL 1373 Pre-Modern Political Thought**4 QH**

Presents an analytical and historical examination of the great political thinkers and the main trends of political thought from classical Greece to the Renaissance. (V) *Prereq.* *Middler standing or above.*

POL 1374 Modern Political Thought**4 QH**

Presents an analytical and historical examination of the great political thinkers and the main trends in political thought from the Renaissance to the twentieth century. (V) *Prereq.* *Middler standing or above.*

POL 1378 Contemporary Political Thought**4 QH**

Analyzes current ideals, ideologies, and political movements, including existentialism, neo-Marxism, black power, and women's liberation. Also studies the decline of ideology and behavioralism.

POL 1379 Marx and Marxism**4 QH**

Studies the social and political thought of Karl Marx. Examines the development of Marxian theory after Marx's death. Discusses class struggle, social revolution, and communism. (V)

POL 1382 Intergovernmental Relations**4 QH**

Analyzes the relationships among national, state, and local levels of government in the United States and the changing patterns of those relationships.

POL 1384 Arab-Israeli Conflict**4 QH**

Analyzes the effects of the Arab-Israeli confrontation on the internal politics of the Arab states and Israel, Pan-Arab politics, and the role of the great powers in the region. (VI)

POL 1386 International Law**4 QH**

Focuses on territory and jurisdiction of states, treaties, recognition, peaceful settlement of disputes, resort to force. *Prereq.* *POL 1112.*

POL 1388 Political Polling and Survey Research**4 QH**

Examines the entire survey research process, which is the most common approach to program evaluation survey design, sampling, questionnaire design, survey administration, data processing, and data analysis. Also involves some statistical analysis. *Prereq.* *POL 1301.*

POL 1389 American National Security Policy 4 QH

Traces the evolution of American national security policy in the post-World War II period. Considers American nuclear military policy and conventional non-nuclear military policy. Explores arms control policy.

POL 1410 Seminar in American Government 4 QH

Offers an in-depth study of selected topics in American government. *Prereq.* Senior political science major and permission of instructor.

POL 1411 Seminar in International Relations 4 QH

Offers an in-depth study of selected topics in international relations. *Prereq.* Senior political science major and permission of instructor.

POL 1413 Senior Seminar in Political Science 4 QH

Offers an in-depth study of selected topics in political science. *Prereq.* Senior political science major.

POL 1415 Seminar in Public Law and Social Issues 4 QH

Explores the various attempts to give law a satisfactory philosophical foundation and the major critiques of the role of law in modern society. Places special emphasis on the attempt by courts to render justice in various areas of law. The central issue is whether law is a source of objective and determinate, rather than merely personal or political, answers to contentious legal questions. *Prereq.* Junior or senior standing.

POL 1710 Introduction to Politics (Honors) 4 QH

Honors equivalent of POL 1110.

POL 1711 Introduction to American Government (Honors) 4 QH

Honors equivalent of POL 1111.

POL 1712 Introduction to International Relations (Honors) 4 QH

Honors equivalent of POL 1112.

POL 1800, POL 1801, POL 1802 Directed Study 4 QH each

Offers independent work on chosen topics under the direction of members of the department. *Prereq.* Junior or senior standing and permission of instructor.

POL 1803 Internship in Politics 4 QH

With department approval, students engage in a political or governmental internship under the supervision of a faculty member. *Prereq.* Junior or senior standing normally required.

POL 1804 Vote Smart Practicum 4 QH

Offers supervised hands-on experience with a nationally recognized non-partisan voters' information resource center. Students are trained on the computer in the use of various databases, engage in assigned research tasks, and assist voters and journalists seeking information on candidates for federal and state office.

POL 1805 Internship in American Government and Politics 4 QH

Students engage in an internship in the Federal government with department approval, under the supervision of a faculty member. *Prereq.* Junior or senior standing usually required.

POL 1815 Internship in State Government 6 QH

Combines state government work experience with academic studies. Students work 15 hours per week in a state government

office and attend classes every other week in which work experience and related readings are discussed. *Prereq.* POL 1111 or POL 1318.

Psychology

PSY 1110 Perspectives in Psychology 1 4 QH

Surveys the fundamental principles and issues of the major areas of contemporary scientific psychology. Approaches the study of psychology as a method of inquiry as well as a body of knowledge. Emphasizes biological bases of behavior, principles of learning and motivation, psychological testing, personality dynamics, psychopathology, and therapeutic approaches. *Students who earn credit for PSY 1111 will not earn credit for PSY 1110. (II)*

PSY 1111 Foundations of Psychology 1 4 QH

Surveys the fundamental principles and issues of the major areas of contemporary scientific psychology. Approaches the study of psychology as a method of inquiry as well as a body of knowledge. Emphasizes biological bases of behavior, principles of learning and motivation, psychological testing, personality dynamics, psychopathology, and therapeutic approaches. Requires research participation in psychology experiments (or alternative). *Students who earn credit for PSY 1110 will not earn credit for PSY 1111.*

PSY 1112 Foundations of Psychology 2 4 QH

Continues PSY 1111, emphasizing the areas of lifespan development, sensory and perceptual processes, states of consciousness, cognition, language, memory, emotion, and social influences on behavior. Requires research participation in psychology experiments (or alternative). (Overlaps PSY 1113.) *Prereq.* PSY 1110 or PSY 1111.

PSY 1113 Perspectives in Psychology 2 4 QH

Continues PSY 1110, emphasizing the areas of lifespan development, sensory and perceptual processes, states of consciousness, cognition, language, memory, emotion, and social influences on behavior. (Overlaps PSY 1112.) (II) *Prereq.* PSY 1110 or PSY 1111.

PSY 1210 Research Methods in Psychology 4 QH

Introduces research methods in psychology such as field research, content analysis, case research, survey methods, simulations, and laboratory experiments. Examines issues of research fairness and evaluating research methods. Explores basic statistical notions including sampling, variability, and correlation. *Prereq.* PSY 1112 or PSY 1113.

PSY 1211 Statistics in Behavioral Science 1 4 QH

Introduces descriptive statistics (scales of measurement, frequency distribution and graphs, measures of central tendency, dispersion and correlation, standard scores, and the unit normal curve) and probability theory (permutations, combinations, and the binomial theorem). *Prereq.* MTH 1101 or MTH 1107.

PSY 1212 Statistics in Behavioral Science 2 4 QH

Offers a general presentation of hypothesis testing, including parametric and nonparametric tests, with emphasis on formulating hypotheses and choosing appropriate scales of measurement, tests, and confidence levels. *Prereq.* PSY 1211.

PSY 1215 Sexual Behavior 4 QH

Focuses on the sexual activities of the human male and female from infancy to adulthood. Considers the importance of sexual

factors in the life history of the individual, statistical surveys of sexual behavior, and direct observational measures of sexual responding. Explores the nature of love, responses to pornography, prostitution, bisexuality, male and female homosexuality, rape, child abuse, and sexual therapy.

PSY 1216 Researching Consciousness

4 QH

Introduces the varied scientific approaches to the study of consciousness and the diverse theories of consciousness and the mind. Explores biology and consciousness; drug-induced states of consciousness, dreaming; hypnosis, meditative states, pain perceptions, animal minds, and anomalistic psychology (e.g., near-death experiences and ESP). Examines data, theory, and methodological and conceptual problems.

PSY 1218 Psychology of Women

4 QH

Introduces the student with little or no background in psychology to the current theories and research on the psychology of women. Critically examines psychological, biological, and social influences on gender differences, gender roles, and gender stereotypes in the light of scientific evidence and individual experience. Assesses their consequences for society. Uses the unique perspective generated in the field of the psychology of women to evaluate traditional research methods in psychology as well as the major psychological theories formulated to explain women and the differences between women and men. Emphasizes critical-thinking skills.

PSY 1220 Biological Basis of Mental Illness

4 QH

Examines current hypotheses of brain dysfunction involved in mental illness. Explores the field of biological psychiatry including events in the brain that can be linked to mental disorder. Studies current neurochemical and genetic theories of diseases such as schizophrenia and depression. Emphasizes recent research and critically assesses treating mental disorders biologically, such as with drug therapy.

PSY 1231 Learning and Motivation I

4 QH

Offers an introduction to the basic learning and motivational principles that permit humans and animals to adapt effectively to a changing environment. Emphasizes research and theories of operant and Pavlovian conditioning, with discussions of discriminations and generalization, avoidance and punishment, acquired motivational states (for example, addiction), concept formation, biological constraints on learning and behavior, animal cognition, and other related topics. Relates learning and motivational principles to the understanding and treatment of behavioral, affective, cognitive, and motivational disorders. *Prereq.* PSY 1112 or PSY 1113.

PSY 1241 Developmental Psychology

4 QH

Examines changes in social relationships, moral reasoning, language, cognition, sensation and perception, personality, and sex roles that occur with development from infancy through adolescence. Examines major theories of development regarding the role of biology, social learning, and peer and parental influences. Explores individual differences (in attachment and temperament, for example) and research issues relevant to the study of children. *Prereq.* PSY 1112 or PSY 1113.

PSY 1242 Adult Development and Aging

4 QH

Examines theories of adult personality development and views on the stability of personality over time. Explores changes from young adulthood onward in sexuality, heterosexual relationships, friendships, and occupational roles as well as age-related differ-

ences in learning, memory, intelligence, and physical functioning. Attention is also given to issues surrounding family violence, age-related changes in mental health and suicide rates, death and dying, ageism, and intergenerational relations. *Prereq.* PSY 1112 or PSY 1113.

PSY 1243 Infant Development

4 QH

Focuses on the fact that during the first two years of life, the basic physical perceptual, cognitive and emotional capacities emerge and interact in the development of such complex behaviors as visually guided movement, the formation of social attachments, and the emergence of language. Provides an introduction to this critical period of human development; emphasizes how the infant's biological inheritance interacts with the physical and social environment in the generation of these important abilities and behaviors. *Prereq.* PSY 1241 or ED 1102.

PSY 1244 Childhood Mental Illness and Mental Retardation

4 QH

Focuses on mental illnesses that are first diagnosed in childhood such as autism, phobias, conduct disorders, and attention-deficit disorder. Overviews childhood depression and suicide and disorders of eating and sleeping. Covers etiological factors in mental retardation (e.g., maternal disease, lead poisoning, chromosome abnormalities). Describes personality characteristics of individuals with mental retardation as well as the effects of institutionalization, mainstreaming, and psychological interventions. *Prereq.* PSY 1112.

PSY 1251 Food, Behavior, and Eating Disorders

4 QH

Investigates what starts and stops eating behavior. Examines taste, nutrition, metabolism, the brain, food experiences, and societal factors that control feeding behavior. Emphasizes the biological/psychological interaction in normal eating and in pathological eating, such as anorexia, bulimia, and extreme obesity.

PSY 1262 Psychology of Language

4 QH

Provides a basic introduction to psycholinguistics. Topics include the nature and structure of languages, processes involved in the production and comprehension of language, the biological bases of language, and aspects of language acquisition. Examines current theories of language processing and related experimental findings. *Prereq.* PSY 1112 or PSY 1113.

PSY 1263 Nonverbal Communication

4 QH

Examines the messages we send by posture, facial expression, gesture, gait, and interpersonal distance. Also explores how power, status, and gender affect nonverbal communication. *Prereq.* PSY 1112 or PSY 1113.

PSY 1271 Social Psychology

4 QH

Provides an introductory survey of social psychology. Focuses on aggression, attribution, attitude formation, change, measurement, conformity, impression formation, and group processes (social facilitation, deindividuation, for example). *Prereq.* PSY 1112, PSY 1113, or permission of instructor.

PSY 1272 Personality I

4 QH

Offers a systematic study of the normal personality and its development. Focuses on behavioral, dynamic, and constitutional determinants, assessment of personality, research; surveys the major theories of personality. *Prereq.* PSY 1112 or PSY 1113.

PSY 1273 Personality 2

4 QH

Continues PSY 1272. *Prereq.* PSY 1272.

PSY 1274 Psychology and the Law**4 QH**

Traces the effects of psychological factors through the course of a trial, including such issues as accuracy of eyewitness identification, plea bargaining, jury selection, persuasion tactics in the courtroom, presumption of innocence, jury size, jury decision rules, and sentencing and punishment.

PSY 1280 Black Psychological Identity**4 QH**

Provides an interdisciplinary look at the social, political, and psychological factors shaping contemporary African-American identity. Explores several different factors that interact with blackness to shape the diversity of African-American experience, such as skin color, gender, culture, and class. Studies black identity as it has been conceptualized, measured, and researched by psychologists. Readings include essays written by important African-American thinkers, fiction and autobiographical narratives, as well as empirical research in the field of psychology. This course is the same as AFR 1280.

PSY 1351 Psychobiology**4 QH**

Focuses on the relation between brain function and human behavior. Examines how nerve cells function individually and work together both in small networks and in the nervous system; the structure of the nervous system; how our sense organs provide the nervous system with information about the outside world; how the brain controls movement; and how psychological concepts from motivation to language and memory are represented in the brain. *Prereq.* PSY 1112, PSY 1113, or permission of instructor.

PSY 1353 Animal Behavior**4 QH**

Surveys animal behavior in a wide range of species (reptiles, birds, fish, and mammals, including humans) to find similarities and differences in the behavioral processes and physiological mechanisms by which individual organisms and species adapt to their environments. The first section focuses on adaptive specializations exhibited by animals in learning about their environments during early development and as adults. The second section examines problems of social organizations at the individual level: how animals communicate with each other and transmit "cultural" skills; mechanisms underlying cohesion and dispersal (for example, reproduction and aggression); and the adaptive advantages of being social or asocial. The final section provides students with an unusual opportunity to apply concepts and experimental methods they have learned by actually doing a short field study of animal behavior at the Boston Zoological Park. *Prereq.* PSY 1112, PSY 1113, or permission of instructor.

PSY 1362 Child Language**4 QH**

Examines how language develops in children. *Prereq.* PSY 1262, linguistics, or permission of instructor.

PSY 1364 Cognition**4 QH**

Provides a basic introduction to human cognition. Topics include pattern recognition, attention, memory, categorization and concept formation, problem solving, and aspects of cognitive development. Examines current theories of cognitive processing and related experimental findings. *Prereq.* PSY 1112 or PSY 1113.

PSY 1365 Language and the Brain**4 QH**

Focuses on linguistic behavior from a neuro-psychological viewpoint. Examines models of how the nervous system, and the brain in particular, controls the production, perception, and internal manipulation of language. Considers localization of cerebral functions and hemispheric lateralization; experimental and clinical

evidence for functional models; aphasia and other language pathologies; schizophrenic language; evidence from "slips of the tongue"; and the bilingual brain. Compares speech, sign language, and writing systems. Also discusses interpretation and translation. *Prereq.* PSY 1262 or permission of instructor.

PSY 1371 Industrial/Organizational Psychology**4 QH**

Surveys the psychological fundamentals underlying performance in work settings. Topics include psychological testing, performance evaluation, training, motivating, and leading employees, and the social psychology of organizations. Emphasizes ethical and affirmative action issues. *Prereq.* PSY 1271 and PSY 1211.

PSY 1373 Abnormal Psychology 1**4 QH**

Surveys the abnormal personality, including systems of diagnoses, defense mechanisms, and criteria of psychopathology. Examines the symptomatology, etiology, and dynamics of anxiety disorders (phobia, obsessions, compulsions, etc.), dissociative disorders (amnesia, multiple personality, etc.), and somatoform disorders. Examines case histories in detail. *Prereq.* PSY 1112 or PSY 1113.

PSY 1374 Abnormal Psychology 2**4 QH**

Surveys psychological and somatic therapies. Examines the symptomatology, etiology, dynamics, and therapy of schizophrenia, paranoid disorders, mania, depression, and organic disorders. *Prereq.* PSY 1373.

PSY 1381 Sensation**4 QH**

Provides an introduction to the study of our senses, with emphasis on hearing, touch, taste, and smell. Focuses on how we measure our sensory abilities and relates findings to the functioning of sensory organs—ears, skin, mouth, and nose—and of the sensory nervous system. *Prereq.* PSY 1112 or PSY 1113; PSY 1351 is highly recommended.

PSY 1382 Perception**4 QH**

Offers a study of our awareness of the world around us, exemplified primarily by visual perception. Covers light, visual sensory mechanisms, color vision, illusions, consciousness, and dreams. *Prereq.* PSY 1112 or PSY 1113; PSY 1351 is highly recommended.

PSY 1410 Systems and Theories of Psychology**4 QH**

Presents in an historical context the core ideas and theoretical positions encountered by students in previous courses. Examines different systematic orientations such as structuralist, functionalist, Gestalt, psychoanalytic, behaviorist, cognitive, and humanistic psychology to demonstrate the extent to which the systems influence contemporary American psychology. *Prereq.* Junior or senior status in psychology major or permission of instructor.

PSY 1431 Behavior Therapies**4 QH**

Offers a study of successful projects that have provided effective remediation and rehabilitation in institutions for the mentally ill, the mentally retarded, and the developing human (schools). *Prereq.* PSY 1231 or permission of instructor.

PSY 1442 Human Memory**4 QH**

Offers a detailed examination of how people learn and remember. Examines the different kinds of memory, short-term, episodic, and semantic, with emphasis on current theories of memory function and related experimental findings. *Prereq.* PSY 1364 or PSY 1262.

PSY 1451 Psychopharmacology**4 QH**

Examines interactions between drugs, brain, and behavior. Focuses on such topics as synaptic transmission, behavioral functions of specific neurotransmitter systems, pharmacological treatment of mental and neurological disorders, and drug abuse. *Prereq.* PSY 1351 or equiv. with permission of instructor.

PSY 1499 Psychology of Reading**4 QH**

Provides an overview of issues in the psychology of reading. Topics include the nature of the reading process as a cognitive activity, eye movement patterns in reading, stages of reading development, and dyslexia. Examines current theories of reading and text comprehension. *Prereq.* PSY 1262 or PSY 1364.

Directed Studies — Honors Courses**PSY 1710 Perspectives in Psychology 1 (Honors)****4 QH**

Honors equivalent of PSY 1110. (II)

PSY 1713 Perspectives in Psychology 2 (Honors)**4 QH**

Honors equivalent of PSY 1113.

PSY 1770 Honors Directed Study**4 QH**

For details contact the undergraduate coordinator in the psychology department, 125 Nightingale Hall.

PSY 1890, PSY 1891, PSY 1892, PSY 1893, PSY 1894 Directed Study**4 QH each**

Offers independent work under the direction of the psychology department, usually in a research project in one of the department labs. Faculty members normally require completion of advanced lab courses in the area of research interest, but this is a matter of individual discussion. Students interested in directed study should consult a departmental adviser. *Prereq.* Permission of instructor.

PSY 1895, PSY 1896, PSY 1897, PSY 1898**4 QH each****Junior/Senior Honors Program**

For details contact the honors office.

Laboratories**PSY 1511 Experimental Design in Psychology****4 QH**

Focuses on the experimental method in the design, execution, analysis, and reporting of psychological investigations of humans and animals. *Prereq.* PSY 1112 or PSY 1113 and PSY 1212.

PSY 1530 Experiments in Learning and Motivation**4 QH**

Gives students the opportunity to assess the generality, specificity, and robustness of learning and motivational principles primarily through field experiments with free-ranging feral animals. Involves designing and conducting experiments and writing reports on operant and Pavlovian conditioning, adjunctive behavior, biofeedback, and related topics. Focuses on the theoretical and clinical implications of experimental findings. This course does not use laboratory animals. *Prereq.* PSY 1231 and PSY 1211.

PSY 1531 Learning and Motivation Laboratory**4 QH**

Gives students the opportunity to gain proficiency, through direct experience, in lab analysis of behavior and in evaluating common generalizations about human behavior. Expects students to design and perform experiments in animal and human learning, memory, decision processes, concept formation, and other topics of individual interest. *Prereq.* PSY 1212 and PSY 1231.

PSY 1551 Laboratory in Psychobiology**4 QH**

Introduces the methods of research in psychobiology. Expects students to work in small groups, conducting three to four hands-on laboratory exercises under supervised conditions. Expects students to read selections of the relevant scientific literature, analyze the collected data, and write experimental reports. *Prereq.* PSY 1351 or permission of instructor.

PSY 1562 Psycholinguistics Laboratory**4 QH**

Provides students the opportunity to acquire first-hand experience in conducting research on issues in the psychology of language. Focuses on classical experiments and their implications for broader issues of language processing. Involves students in all aspects of each experiment, including collecting and analyzing data and preparing lab reports. *Prereq.* PSY 1212 and PSY 1262 or PSY 1364.

PSY 1564 Cognition Laboratory**4 QH**

Provides students the opportunity to acquire first-hand experience in conducting research on issues in human cognition. Focuses on classical experiments and their implications for broader issues of cognitive functioning. Involves students in all aspects of each experiment, including collecting and analyzing data and preparing lab reports. *Prereq.* PSY 1212 and PSY 1364 or PSY 1262.

PSY 1571 Laboratory in Social Psychology**4 QH**

Provides an introduction to the methods of social-psychological research. Assists students in developing the ability to read published social research with a critical eye, to pose questions in a testable manner, to apply experimental methods to social research, and to express themselves in APA journal style. *Prereq.* PSY 1212 and PSY 1271.

PSY 1572 Personality Laboratory**4 QH**

Provides an introduction to the methods and areas of personality research. Discusses problems of measurement, control, and interpretation. Critically examines representative published experiments. Expects students to design, collect data for, assess, and write up several experiments, including one original research project. *Prereq.* PSY 1212 and PSY 1272.

PSY 1581 Sensation and Perception Laboratory**4 QH**

Focuses on experiments involving precise measurements of both physical and psychophysical phenomena, including auditory function, color vision and after-effects, muscular sensation, tactile sensitivity, and adaptation to perceptual distortions. *Prereq.* PSY 1212 and PSY 1381 or PSY 1382.

Seminars**PSY 1610 Psychological Research and Personal Values****4 QH**

Examines ethical concerns and values in designing and applying research, in setting research goals, and in using research subjects. Develops strategies for reflecting on ethical concerns from historical, psychological, philosophical, sociological, and spiritual perspectives, and for putting personal values into action through innovation, advocacy, career decisions, etc. *Prereq.* Any laboratory course in psychology and research or co-op experience in psychology.

PSY 1614 Seminar on Heredity and Society**4 QH**

Focuses on the origins of the intelligence testing movement and the movement's relation to eugenics and to behavior genetics. Studies history, methods, substantive findings, and social implications of psychological measurement and testing. Examines the

extensive research literature on intelligence testing and the nature/nurture problem in areas such as psychopathology, criminality, and alcoholism. *Prereq.* *Permission of instructor.*

PSY 1632 Seminar in Behavior Modification 4 QH

Discusses topics in behavior modification in a seminar format. *Prereq.* *PSY 1231, PSY 1531, or permission of instructor.*

PSY 1651 Seminar in Psychobiology 4 QH

Offers intensive study, discussion, and practice in lab studies of physiological variables. Covers evolution of the nervous system, sensory and motor mechanisms, motivation and emotion, sleep, attention and perception, learning, and memory. *Prereq.* *PSY 1351 or permission of instructor.*

PSY 1661 Seminar in Psycholinguistics 4 QH

Offers intensive study and discussion of issues in the psychology of language. Specific topics vary by quarter. *Prereq.* *PSY 1212 and PSY 1262 or PSY 1364.*

PSY 1662 Seminar in Cognition 4 QH

Offers intensive study and discussion of issues in cognitive psychology. Specific topics vary by quarter. *Prereq.* *PSY 1212 and PSY 1262 or PSY 1364.*

PSY 1671 Seminar in Social Psychology 4 QH

Expects students to examine and present in class their findings on a particular topic in social psychology, such as attribution, aggression, conformity, attitude-behavior relationship. *Prereq.* *PSY 1271 or permission of instructor.*

PSY 1672 Seminar in Clinical Psychology and Personality 4 QH

Offers seminar presentations of topics relevant to understanding the normal and disturbed personality. Covers topics such as specialized assessment procedures, cognitive styles in personality, temperament, hypnosis, anxiety, aggression, specialized clinical syndromes, and the development of conscience. *Prereq.* *PSY 1373 or permission of instructor.*

PSY 1681 Seminar in Sensation and Perception 4 QH

Expects students to present in class their finding on topics such as how perceptions are organized, formed, and modified by sensory, attentional, motivational, and cognitive factors, how our sensory systems extract information from the environment in a consistent and lawful manner, despite large changes in environmental conditions, and how to account for this in physiological terms. *Prereq.* *PSY 1351 and PSY 1381 or PSY 1382.*

Sociology

SOC 1100 Introduction to Sociology 4 QH

Explores basic concepts and theories concerning the relation between individuals and society. Emphasizes the influence of culture, social structure, and institutions in explaining human activity. Discusses and analyzes social groups, socialization, community, class, power, and social change, among other substantive issues.

SOC 1101 The Sociology of Everyday Life 4 QH

Examines the development, application, and consequences of rules for everyday activities (for example, walking, talking, eating, drinking, sitting, smoking, laughing, crying, and sleeping).

Considers the effects of artifacts, culture, space, and territory on these activities, on social life, and on the expression of emotions.

SOC 1102 Social Inequality and Communication 4 QH

Analyzes the ways in which groups and institutions, in both their ritual and everyday activities, communicate the idea of hierarchy and an individual's place in it through face-to-face interaction, formal communication, and the use of space and time. Takes a dramaturgical approach to social organization, with special emphasis on status images in the media and the communication of social place by service organizations and professional groups. Includes some content analysis and observational fieldwork.

SOC 1103 American Society 4 QH

Focuses on American society, culture, and major social institutions: economic, religious, governmental, familial, educational, welfare, and recreational. Examines social classes and stratification, mobility, and individualism. *Prereq.* *SOC 1100 or equivalent.*

SOC 1104 Contemporary Japanese Culture and Society 4 QH

Focuses on contemporary Japanese urban society. Examines major values, family structure, sex roles, social control, the economy and the division of labor, mass media, religion, arts, and social problems. (IV)

SOC 1105 Society and Culture in Russia and the Former Soviet Union 4 QH

Focuses on contemporary Russian society. Emphasizes the social, economic, and political reforms of the Gorbachev period and the ways in which the Soviet Union has evolved since 1917 and in the post-Soviet period. (IV)

SOC 1120 Sociology of Boston 4 QH

Examines Boston from the perspectives of environmental development, neighborhood and intergroup relations, institutional services, and symbolic meanings. Explores current issues in the city through term projects. Requires field trips.

SOC 1121 Doing Sociology 4 QH

Takes a research approach to sociology. Focuses on students' participation in their own learning about sociology as a body of knowledge and as a method of studying social life. Requires students to use the computer during the course. (II)

SOC 1125 Social Problems 4 QH

Analyzes in both empirical and theoretical terms many of the social problems currently facing Americans. Focuses on the deepening inequality and poverty among working and middle-class Americans, particularly racial minorities, women, and youth; related problems of racism and sexism; the disintegration of the family; growing unemployment; the international ecological crisis; the deterioration of the health system; crime; war and militarism; and strategies and political options for solving these problems.

SOC 1135 Social Psychology 4 QH

Examines the effects of social interaction on individual behavior. Surveys major theoretical orientations and substantive topics such as presentation of self, effect of television, conformity in fads, gossip and rumor, mass and serial murder, and bystander apathy.

SOC 1140 Sociology of Prejudice and Violence 4 QH

Examines factors in the development and maintenance of prejudice and discrimination. Discusses American race relations, anti-Semitism, sex roles, and stereotyping.

SOC 1146 Environment and Society**4 QH**

Examines the political economy of the global environmental crisis. Topics vary from quarter to quarter and include such issues as world resource availability, energy, pollution, ecological degradation in the Third World, environmental policy, and social movements. Involves practical experience in environmental problem solving. (VI)

SOC 1147 Urban Social Problems**4 QH**

Focuses on the foundations of urban life in historical perspective. Analyzes relation of city life to environment, population, social organization, technology and cultural values. Examines growth trends, urbanization, urban planning, and citizen action.

SOC 1150 Introduction to Women's Studies: Image, Myth, and Reality**4 QH**

See INT 1150 for course description.

SOC 1155 Sociology of the Family**4 QH**

Focuses on the family as a social institution in several selected cultures; interrelations of the family and political, economic, and educational institutions; social nature of personality; role taking; individualism, mobility, and industrialism. (V)

SOC 1156 Violence in the Family**4 QH**

Examines physical, emotional, and sexual violence in families, with emphasis on child, sexual, and spouse abuse. Covers definitions, prevalence, causes, prevention, and treatment of specific cases of domestic violence. Focuses on social policy issues and problems of legal intervention in cultural and family issues.

SOC 1160 Gender in a Changing Society**4 QH**

Considers why and how gender is constructed in American society, and looks at different theories of gender. Includes topics such as the expression of gender in everyday life; its development in childhood; its centrality in the traditional family, the workplace, and sexuality; and its role in violence against women.

SOC 1165 Students, Schools, and Society**4 QH**

Emphasizes the role of education in processes of socialization, social mobility, social control, and social change. Do social characteristics (sex, race, class, age, physical status) influence the school experience? Do schools provide opportunity and initiate change, or do they perpetuate the status quo in economic, political, and social life? Who goes to school, where, for how long, and with what result? How does educational advantage get translated into jobs and social status? Encourages students to draw on their own experiences to develop paper topics.

SOC 1168 The Social Movements of the 1960s**4 QH**

Considers the social and cultural movements of the 1960s and their origins in the Civil Rights movement. Examines the opposition to government policies and social norms that developed into the Civil Rights, student, New Left, antiwar, countercultural, and women's movements in order to understand their grievances, goals, composition, and impact.

SOC 1170 Race and Ethnic Relations**4 QH**

Focuses on racial and religious groups, particularly with reference to the United States. Places special emphasis on historical development, specific problems of adjustment and assimilation, and specific present-day problems and trends. *Prereq.* SOC 1100 or equivalent.

SOC 1171 Race and Ethnic Relations: A World Perspective**4 QH**

Offers a cross-cultural analysis of race and ethnic relations in Western and non-Western societies. Examines race and ethnic

relations in terms of contemporary developments, world problems, and ideological conflicts.

SOC 1175 Sociology of Work**4 QH**

Analyzes dramatic changes occurring in the work lives of Americans and considers the future of American workers within the global economy. Explores emerging labor markets, gender, race, and technology in shaping contemporary American work settings. (VI)

SOC 1176 Sociology of Business/Industry**4 QH**

Focuses on the role of industry in modern society. Examines similarities and dissimilarities among industrial societies, bureaucracy and its alternatives, unions, supervision democracy and manipulation, the worker on the assembly line, sabotage of the organization, and the role of wages and alienation.

SOC 1177 Social Roles in the Business World**4 QH**

Analyzes the social structure of corporate and business life in contemporary America. Presents and discusses case studies from major accounting and/or industrial firms. Examines the "career line" in the world of business and management, with a special focus on age/sex, racial/ethnic, and class/income barriers.

SOC 1178 Women Working**4 QH**

Discusses the fact that differences in the labor force experience of men and women workers generally go unrecognized, and the work experience most common to women—household work—is rarely analyzed. Covers women's market and nonmarket activities, their rewards, and their problems, in addition to empirical and theoretical analyses of the work roles of women. Overall, underscores the differences between work experiences of men and women.

SOC 1180 Sociology of Consumerism and Consumer Behavior**4 QH**

Provides students with an opportunity to explore a relevant consumer issue.

SOC 1185 Deviant Behavior and Social Control**4 QH**

Explores the conditions under which people categorize others as deviant; processes by which persons so defined are assigned deviant status and assume appropriate roles and self-images; development of deviant careers and their relation to deviant subcultures; situations in which people transform deviant identity.

SOC 1190 Juvenile Delinquency**4 QH**

Examines the sociological and psychological approaches to and their implications for a typology of delinquency. Discusses problems of prevention, treatment, and rehabilitation.

SOC 1195 Drugs and Society**4 QH**

Offers an introduction to the sociology of drugs. First examines social definitions of drugs, conditions of their use, and socialization into drug use. Then considers deviant drug use and effects of social control on definitions and use. Considers a range of licit and illicit drugs, but gives major emphasis to alcohol, marijuana, and heroin.

SOC 1200 Sociology of Alcoholism**4 QH**

Focuses on social responses to deviant alcohol use. Examines drinking cultures and drinking practices in the United States; processes by which people are labeled "alcoholics"; and the role of agencies of social control, such as the criminal justice system and the health care system, in labeling and in rehabilitation.

SOC 1201 Alcohol Use and Social Control**4 QH**

Examines how societies define and enforce rules on alcohol use, including the conditions under which controls, informal and formal, come into being, and the consequences of these controls. Examines case studies of Prohibition, liquor control, public drunkenness, alcoholism, legal drinking age, drinking and driving, and drinking in college.

SOC 1202 Sociology of Drinking**4 QH**

Examines how different groups and societies organize drinking as a social act and the consequences of that organization. Singles out for particular attention the cultural meaning assigned to drinking, the social elements found in all drinking situations, how members of social groups learn how to drink, and the social and psychological functions of drinking.

SOC 1205 Law, Crime, and Social Justice**4 QH**

Analyzes the impact of the legal system on the creation and perpetuation of criminality in contemporary American society. Devotes particular attention to the study of the creation of criminal law, the judicial process, and the role of law in the gap between crime and social justice. Suitable for students in prelaw, criminal justice, political science, and allied fields.

SOC 1206 Class, Crime, and the Police**4 QH**

Summarizes the major psychological, social, biological, economic, and political theories about the cause of crime. Applies these theories to the daily operations of the police, courts, and prison system in the United States. Examines white collar crime and the class bias inherent in the more lenient treatment of elite criminals.

SOC 1215 Sociology of Health**4 QH**

Examines health and illness in the socio-political context. Focuses on the health professions, the health system, issues of cost, and availability of care. Compares the United States system with those of Western Europe, Eastern Europe, and the Third World. *Prereq.* SOC 1100 or permission of instructor.

SOC 1217 Women, Health, and Social Change**4 QH**

Examines how women have traditionally been viewed by the medical field and how reproduction and childbirth came to be defined as medical problems. Also examines the implications for women in the changes that have taken place in health care, especially as these pertain to new reproductive frontiers and alternative health care facilities. Discusses the role of women in the health care professions.

SOC 1225 Aging and Society**4 QH**

Surveys issues and questions on aging, with special attention to social and economic consequences of the aging process, including retirement and productivity, health care problems, nursing home residences, widower- and widowhood, and the approach of death. Presents examples relating to aging in other cultures in a search for new answers to social problems of aging in the United States. Gives students the opportunity to learn to anticipate, cope with, and even prevent problems of aging that concern self, family, and clients/patients.

SOC 1235 Death and Dying**4 QH**

Focuses on the treatment of death and dying, including problems faced by health care professionals, family members, institutions, the funeral industry, and the dying themselves. Discusses cross-cultural perspectives, the social distribution of mortality, the changing nature of death, and the ethical problems in determining

life and death with particular attention to such issues as abortion, suicide, and ceasing medical intervention. *Prereq.* SOC 1100 or permission of instructor.

SOC 1240 Sociology of Human Service Organizations**4 QH**

Introduces selected theoretical perspectives on human service organizations, emphasizing defining organizational goals and effectiveness. Gives students the opportunity to become familiar with the nature of human service organizations; to compare these organizations to business and industrial organizations; to outline specific problems that human service organizations face; and to propose potential solutions.

SOC 1245 Sociology of Poverty**4 QH**

Analyzes American poverty in historical perspective, drawing on comparisons with other countries. Critically evaluates of sociological research and theories relating to poverty. Considers causes and effects of poverty, as well as societal responses to poverty and its consequences. Suitable for students in applied fields, such as nursing, criminal justice, education, allied health, pre-med, and pre-law.

SOC 1247 Food and Hunger**4 QH**

Examines the social causes and consequences of hunger and alternative approaches to solving world hunger.

SOC 1250 The Sociology of Private and Public Assistance**4 QH**

Helps students understand why public and private assistance in the United States takes the form it does. Examines the ideology behind the welfare system, the kinds of assumptions made about the poor, how other countries deal with the problem, the effects of poverty in the United States, and some explanations for its continuing existence.

SOC 1255 Sport in Society**4 QH**

Analyzes the social origins and functions of leisure activities, with special emphasis on games and sports as forms of leisure. Gives considerable emphasis to cross-cultural and historical analysis, as well as to the relation between leisure activities and various social institutions—economy, polity, family, and religion. (See SOA 1255.)

SOC 1275 Sociology of the Arts**4 QH**

Examines the relation between the social organization of society and the forms of art produced—the social role of the artist, how the arts are “manufactured” and distributed, the art consumer’s relation to art and the artist, social support for the arts. Deals with a variety of art forms, with emphasis on the performing arts.

SOC 1276 Sociology of Popular Culture**4 QH**

Presents a sociological analysis of popular culture, focusing on the relationship between pop culture and social institutions such as religion, the law, education, the economy, and the family; the organizations and artistic communities that produce pop culture such as the music industry, theatrical groups, advertising agencies; and the social roles and socialization processes associated with individual artists. Examines changes in popular culture from the viewpoint of changes in the larger society.

SOC 1284 Technology and Careers of the Future**4 QH**

Focuses on new technologies and their social impacts on work and careers in the future. Examines sociological and humanistic approaches to technical change in the shop floor, offices, and professions. Also covers issues of design and control, health, employment, and autonomy.

SOC 1285 Environment Technology and Society**4 QH**

Discusses the following questions: Does society control technology or is technology directing society? Has technology become dehumanized? How valid is the doctrine of technological inevitability? Can the technological “fix” be viewed as a solution to social problems? Is technology itself a social problem? What can be expected of technology assessment? What of the back-to-nature and antitechnology movements today: are they the waves of the future? Expects students to do considerable independent study and research. (VI)

SOC 1286 Science and Society**4 QH**

Examines the profound effects of science on our society, and the ways in which political, economic, and social forces have guided developments in science. Explores issues such as “responsibility” created by this interdependence. Emphasizes the social structures within which science operates and is communicated and science as an occupation and profession, as well as a system of thought and set of tools for producing knowledge. (VI)

SOC 1287 Society Tomorrow: Forecasting Alternative Futures**4 QH**

Introduces students to the area of “social futures” or “future studies.” Examines the major techniques used to forecast futures and the specific scenarios and projections about the social world of tomorrow. Considers the major prospects and problems for society in the future.

SOC 1290 Military and American Society in a Nuclear Age**4 QH**

Investigates the relationship between the military and society. Covers selected issues, including the impact of the military on social institutions such as the family, polity, and economy, the arms race and upheaval in social life, the post-cold war legitimization crisis of the United States military, the role of women and minorities as reserve armies, and military spending and domestic social problems.

SOC 1300 Classical Social Thought**4 QH**

Traces the development of sociology from the history of social thought. *Prereq.* Three sociology/anthropology courses.

SOC 1301 Current Social Thought**4 QH**

Reviews the dominant theoretical traditions in contemporary sociology, particularly the pluralist, managerialist, Marxist (or class), and feminist paradigms. Emphasizes Parsonian functionalism; symbolic interactionism; power elite and conflict theory; and neo-Marxist theories of the state, family, economic crisis, imperialism, and global ecological crisis. *Prereq.* Three sociology or anthropology courses.

SOC 1302 Female Perspectives on Society**4 QH**

Examines social science and interdisciplinary feminist literature that focuses on women in families and at work, and that deals with physical issues including violence against women and abortion. Incorporates the perspectives of women of color. Considers and evaluates women's views of social life as well as recognizes the differences among women. (VI)

SOC 1310 Class, Power, and Social Change**4 QH**

Focuses on theories of social inequality as applied to the exercise of power and large-scale social change. Examines contemporary events in order to understand power structures. Required of majors. (V) *Prereq.* One sociology course and middler standing or permission of instructor.

SOC 1320 Introduction to Statistical Analysis**4 QH**

Examines the application of the principles of measurement, probability, measures of centrality, tests of significance, and techniques of association and correlation to social data. *Prereq.* SOC 1100 or permission of instructor.

SOC 1321 Research Methods 1**4 QH**

Introduces students to the research process through an examination of the rules of evidence in empirical research and the place of values. Gives students the opportunity to learn how to design and critique types of sociological research, how to collect qualitative and quantitative data, and how to sample populations. *Prereq.* SOC 1100 and SOC 1320, or permission of instructor.

SOC 1322 Research Methods 2**4 QH**

Requires students to complete the research project begun in SOC 1321. Focuses on practice coding, building indexes, scaling, table construction; introduction to use of the computer. *Prereq.* SOC 1100, SOC 1320, and SOC 1321, or permission of instructor.

SOC 1324 Human Services Research and Evaluation**4 QH**

Covers basic issues in applied research and the evaluation of services, including the purposes of evaluation, ethics, formulating questions and measuring answers, designing evaluations and planning oriented research, utilizing evaluation results, and the turbulent setting of action programs. Suitable for students majoring in human services, sociology, psychology, nursing, health education, and related fields. *Prereq.* SOC 1320 or other statistics, SOC 1240, or permission of instructor.

SOC 1335, SOC 1336 Group Behavior 1, 2**4 QH each**

Explores how individuals interact in groups and how groups interact with each other. Focuses on the reflexive self, social aspects of language, situational learning, group perspectives, careers, institutions, and worlds.

SOC 1345 American Demographics**4 QH**

Offers an applied research experience in which students have the opportunity to study the major areas of demography. Focuses on the resources of the United States Census Bureau and, in particular, the data products available from recent census surveys.

SOC 1347 Community Analysis**4 QH**

Explores types of human settlements, focusing on the interaction between people and their political, economic, and social environments. Discusses power structure and citizen action to influence institutions; skills in community analysis, including use of documents, survey, observation, and evaluation of needs and resources; strategies of conflict, cooperation, and negotiation to attain community and group ends.

SOC 1348 Seminar in Urban Studies**4 QH**

Compares interdisciplinary approaches to urban studies according to problem areas and research methods. Gives students the opportunity to extend previous term paper projects after exposure to social action and social systemic theoretical perspectives. *Prereq.* SOC 1147 or permission of instructor.

SOC 1350 Women in Jewish Culture**4 QH**

Uses some of the tools of contemporary feminist theory and methodology to focus on questions about the resurgence of ethnic/religious identities in the United States and the meaning of this for contemporary Jewish women. Analyzes the changing relationship

of women to Judaism by trying to recover Jewish women's experiences in America since the turn of the century by looking at some key institutions—work, family, religion, the feminist movement, the media, literature, and film.

SOC 1355 Politics and Economy in U.S. Society 4 QH

Examines the political economy of United States capitalism. Focuses on the impact of new forms of economic crisis on politics, social classes, labor, and the state.

SOC 1360 Social Class, Status, and Power 4 QH

Focuses on theories of social inequality, concepts of social class, aspects of status and role difference, and criteria for social mobility.

SOC 1365 Collective Behavior 4 QH

Focuses on the rise of new group forms in response to persistent social unrest; masses, crowds, and publics; specific instances of collective behavior such as race riots, wildcat strikes, prison revolts, and campus disorders.

SOC 1375 Sociology of Occupations and Professions 4 QH

Considers occupations and professions as institutions in a broader socio-political context. Includes a historical and international perspective on topics such as training, professional associations, professional services, and the relation of professional groups to capitalism and to states. *Prereq.* Four sociology or anthropology courses or permission of instructor.

SOC 1376 Organization and Bureaucracy 4 QH

Focuses on sociological study of organizations. Examines case studies of private corporations, federal bureaucracies, social service agencies, military-industrial complex, high-risk technological systems, unions. Analyzes recent theories of innovation, participation, and opportunity in complex organizations.

SOC 1385 Social Deviance 2 4 QH

Examines the leading theories of deviance (anomie, subcultural deviance, labeling) and their principal variants; studies their assumptions, conceptions, propositions, and supportive evidence; analyzes empirical studies in each theoretical tradition.

SOC 1470 Sociology of Religion 4 QH

Offers a comparative and analytic treatment of religion as a social institution, focusing on the relations between religious organizations and other social institutions, with particular emphasis on the American experience. Analyzes religion as an agent of social change and stability. *Prereq.* SOC 1100.

SOC 1475 The Sociology of Mass Communication 4 QH

Focuses on factors in the formation and development of public opinion, the effect of television on children, mass communication as social organization, media-depicted images of society, the role of personal influence, the process of rumor, the use of mass media by the poor, propaganda analysis, and the latent and manifest functions of mass communication.

SOC 1485 Computers and Society 4 QH

Examines the impact of the computer revolution on the conditions of work and life in contemporary society including legal and theoretical issues. Discusses ethical and professional issues in computer use. (VT) *Prereq.* Junior in computer science or middler with ability to program.

SOC 1500 Applied Sociology: Practice and Theory 4 QH

Analyzes the conditions under which sociological knowledge is applied to social problems, the kinds of problems, and the degree of effectiveness of this application. Pays particular attention to research and demonstration projects that derive from sociological theory.

SOC 1501 Social Policy and Social Intervention (Formerly Social Control 2) 4 QH

Focuses on study of the formation of social policies in response to social problems; analyzes policies and problems, supporters and opponents of policy change, conditions under which control agencies adopt new policies, and effects of policy change. Places particular emphasis on case studies of social action and legal change.

SOC 1525 Comparative Human Services 1 6 QH

Offers an intensive look at the American human services system. Gives upper-level undergraduate and graduate students the opportunity to study the origins, development, and present state of human services in the United States. Involves lectures as well as field visits in the Boston area. Provides independent study.

SOC 1526 Comparative Human Services 2 6 QH

Offers an intensive study of the British human services system. Provides students the opportunity to immerse themselves in the social and cultural context of British human services and involves field trips in London designed to examine firsthand the planning, administration, and delivery of human services in Great Britain.

SOC 1535 Seminar in Social Welfare 4 QH

Discusses problems in social welfare observed in the term between "Problems" and "Practicum." Requires a research paper, based on directed fieldwork in the intervening term.

SOC 1601 Seminar in Current Emphases in Sociology 4 QH

Reviews and discusses selected sociological topics. *Prereq.* Junior or senior standing in sociology/anthropology or permission of instructor.

SOC 1700 Introduction to Sociology (Honors) 4 QH

Honors equivalent of SOC 1100.

SOC 1710 Class, Power, and Social Change (Honors) 4 QH

Honors equivalent of SOC 1310. Any Honors Program member is eligible to enroll in this course.

SOC 1800, SOC 1801, SOC 1802, SOC 1803 Directed Study 4 QH each

Offers independent work on a chosen topic under the direction of members of the department. Limited to qualified students with approval of department chair. *Prereq.* Junior or senior standing in sociology or permission of instructor.

SOC 1821, SOC 1822, SOC 1823, SOC 1824 4 QH

Junior/Senior Honors Project

For details contact the honors office.

Theatre

THE 1100 Introduction to Theatre Arts

4 QH

Focuses on theatre in performance by examining the work of theatre artists (actors, designers, directors, and playwrights). Introduces students to the dynamics of performance and to the reading of play texts, and provides a brief overview of the development of Western theatre. (II)

THE 1106 Theatre History 1—Beginnings to Renaissance

4 QH

Explores the history of the theatre and its development in the West, focusing on Greece, Rome, Medieval Europe, Golden Age Spain, and Elizabethan and Stuart England. (Can be taken independently of THE 1107.)

THE 1107 Theatre History 2—Renaissance to Naturalism

4 QH

Focuses on the development of theatre in the Italian Renaissance; the spread of Italianate forms throughout Europe during the seventeenth and eighteenth centuries; the rise of Romanticism in Germany and its spread; and the rise of realism and naturalism in France, Scandinavia, and throughout Europe. (Can be taken independently of THE 1106.)

THE 1111 American Musical Theatre

4 QH

Traces the development of the American musical from *The Black Crook* to the present. Considers the role of musical theatre as both entertainment and serious art form through an examination of script, score, dance, and design. Includes works by composers and lyricists such as Rodgers and Hammerstein, Lerner and Loewe, Cole Porter, Bock and Harnick, Leonard Bernstein, and Stephen Sondheim.

THE 1112 Dramatic Theory and Criticism

4 QH

Examines the major theoretical statements about Western theatre from Greece to present day. Devotes a significant portion of the course to twentieth-century critical strategies.

THE 1114 Masters of the Theatre

4 QH

Overviews several great practitioners of theatre. In particular, stresses how society influenced the thought and craft of playwrights, actors, directors, designers, and theorists. Pays careful attention to how the play's ideas are translated into performance. Uses video, discussion, and live performance, when possible, as integral elements in the course. (III)

THE 1116 The American Theatre

4 QH

Traces the historical development of theatre in America, as well as its role as a social institution, economic enterprise, and art form.

THE 1118 Black Theatre in America

4 QH

Surveys the history of black theatre artists in America from the time of Ira Aldridge to the present day. Also examines the works of black playwrights from the Harlem renaissance to the present, with an emphasis on the period beginning with Baraka's *Dutchman*.

THE 1121 Contemporary Theatre

4 QH

Examines the current state of commercial, regional, and other noncommercial theatre in the United States, using readings, lectures, reports, and weekly visits to theatre productions in the area. Explores through lectures the background of these types of theatre in twentieth century American and European theatre.

THE 1127 The Comic Theatre

4 QH

Surveys theatrical comedy from the ancient Greeks to the present. Examines the comic playwright, the comic director, and the comedic actor. Discusses theories and techniques of laughter, as well as the psychological and sociological benefits derived from laughter. Includes reading playscripts by Aristophanes, Molière, Shakespeare, Shaw, and Simon as well as viewing and listening to tapes of Chaplin, the Marx Brothers, and others. Examines comedy devices through lectures, films, records, and attending live performances.

THE 1140 Playwriting 1

4 QH

Offers students the opportunity to develop a series of dramatic dialogues that culminate in the writing of a one-act play. Uses a workshop format.

THE 1149 Script Analysis for the Stage

4 QH

Aids the theatre practitioner in developing the skills necessary for analyzing scripts in preparation for production. Focuses on dramatic theory and structure and theatrical techniques that will enable an actor, director, designer, or playwright to uncover the problems of translating theory into practice. *Prereq.* Theatre major or minor.

THE 1150 Introduction to Acting

4 QH

Focuses on fundamental techniques of stage use, the actor and the stage environment, and improvisations for strengthening imagination and increasing freedom of expression.

THE 1155 Voice for the Theatre

4 QH

Focuses on vocal exercises that enable the actor to better connect with the voice through freeing the physical and emotional self. Emphasizes centering, physicalization, breath support, articulation, resonance, projection, and relaxation. Includes selected monologues and/or scenes for classroom analysis.

THE 1160 Movement 1

4 QH

Emphasizes using the body as an expressive instrument for Realism. Develops concentration, control, and stamina through exercise, relaxation, improvisation, manipulation of energy flow, rhythms, and imagination. *Prereq.* Theatre major or permission of instructor.

THE 1180 Concepts of Direction

4 QH

Focuses on purposes and techniques of theatrical direction related to script analysis, production style, pictorial composition, rhythmic evolution, and empathic responses. *Prereq.* THE 1150 and THE 1212.

THE 1200 Stagecraft

4 QH

Focuses on principles that underlie the coordination and execution of technical production. Examines different kinds of scenery, tools, equipment, and construction materials. Lab work involves preparing technical elements of University productions. *Prereq.* Theatre major or permission of instructor.

THE 1209 Theatrical Drafting

4 QH

Exposes the student to the basic graphics language needed to translate a designer's ideas into technical drawings used for construction through work on supervised classroom projects. *Prereq.* THE 1200.

THE 1210 Scenic Design for the Stage 4 QH
Introduces the theory and practice of theatrical design and the role of the designer in the production process. Through project work, examines the use of the graphics tools—line, form, balance, color, rhythm, etcetera—in the development of the design idea. Emphasizes understanding and utilizing spatial relationships, visually expressing conceptual themes, and understanding the various uses, problems, and practical considerations of proscenium, thrust, and arena staging. Analyzes historical production styles from the Greco-Roman period through the nineteenth century. *Prereq.* THE 1200, THE 1212, or permission of instructor.

THE 1212 Introduction to Theatrical Design 4 QH
Introduces the visual effects of modern theatrical production and the creative processes by which these come into being, through a basic survey of the three major design disciplines, their supporting technology, and their working interrelationship. Addresses the questions of how artistic concepts are developed and related, how they are communicated to other artists and an audience, and how one develops the critical processes necessary to evaluate these concepts.

THE 1213 Scene Design 2: Principles 4 QH
Focuses on the development and expression of conceptual statements from specific dramatic texts through a series of exercises involving script analysis and introductory work in rendering and model construction. Examines texts selected from works of distinct historical and stylistic periods. Studies the heritage of twentieth-century theatrical design through the work of artists such as Appia, Craig, Jones, Urban, and Oenslager. Emphasizes the development of such stylistic treatments as realism, expressionism, symbolism, and constructivist and environmental design. *Prereq.* THE 1210.

THE 1225 Scene Painting 4 QH
Traces the history of scene painting and ornament from classical to contemporary times. Focuses on studio organization, color, color theory, equipment, tools, materials, and costs involved with painting stage scenery. Uses projects and exercises in the use of different media, matching colors, painting of textures, light and shade, and the use of stencils and physical textures. Includes lab sessions involving painting stage scenery for University productions. *Prereq.* THE 1200 or permission of instructor.

THE 1226 Lighting Design for the Stage 4 QH
Examines basic principles and practices of stage lighting, including the qualities and functions of light, lighting instruments and controls, basic electricity, color in light, and analysis of the script in terms of light requirements. Expects students to develop light plots and schedules for various kinds of stage productions. Includes lab work on lighting crews for University productions. *Prereq.* THE 1200, THE 1212, or permission of instructor.

THE 1261 Costuming I 4 QH
Presents the beginning designer with the opportunity to investigate costume design theory and to foster perceptual development. Through lectures and projects, gives students the opportunity to explore both the abstract and historical aspects of costume design as well as textual analysis and its conceptual implications. (Does not require prior art or design education.)

THE 1265 Pattern Drafting and Costume Construction 4 QH
Develops the skills and techniques necessary for the patterning, cutting, and construction of costumes for the stage. Covers flat pattern drafting, draping, and finishing techniques.

THE 1280 Stage Makeup 4 QH
Focuses on the principles of, the reasons for, and the materials used in makeup for the theatre, television, and films. Includes the practical application of types and styles of makeup—straight, old-age, character, and corrective. *Prereq.* Theatre major or permission of instructor.

THE 1284 Theatre Management 4 QH
Focuses on problems of financing, promoting, and programming for profit and nonprofit professional theatre.

THE 1292 Children's Theatre 4 QH
Focuses on theories and methods of creative techniques related to children's programs in schools, churches, and recreational facilities. Analyzes literature in preparation for production of children's plays.

THE 1300 Acting 2 4 QH
Focuses on developing the actor's sense of truth and emotional freedom. Emphasizes creating, developing, and sustaining character and developing ensemble. Includes monologues and scenes performed for classroom analysis. *Prereq.* THE 1150 and permission of department chair.

THE 1301 Acting 3 4 QH
Focuses on further development of the actor's tools, script and character scoring, and exercises for physical and psychological freedom. Includes in-class scenes from works in progress. *Prereq.* THE 1300 and permission of instructor.

THE 1302 Acting 4 4 QH
Deals with scene work from a spectrum of theatrical genre. Focuses on developing a technique for approaching a role through research, character, and language. *Prereq.* THE 1301 and permission of instructor.

THE 1316 Acting for the Camera (Television) 4 QH
Presents the fundamentals of camera acting, adjusting the actor's physical responses to the mechanical eye of the camera and the delicate ear of the microphone. Involves studio work before the television camera to explore the genres of dramatic, commercial, and industrial acting. *Prereq.* THE 1155, THE 1160, and THE 1302.

THE 1325 Musical Theatre Technique 4 QH
Applies acting technique to the performance of musical material. Explores song through text and character progression, develops a process for approaching a song, and synthesizes movement, gesture, and emotion with melody, rhythm, and lyrics. Involves student performances of solo, small ensemble, and large ensemble material. Does not involve singing technique. *Prereq.* THE 1150, THE 1300, and permission of instructor.

THE 1370 Rehearsal and Performance 4 QH
Allows students to participate in public performance through preparation and rehearsals in areas of acting, directing, design, and stagemanaging. *Prereq.* Permission of instructor.

THE 1400 Costuming 2**4 QH**

Offers advanced study in textual interpretation and its application to costume design. Emphasizes conceptual and stylistic development through assigned projects in the various genres of the performing arts. *Prereq.* THE 1261 or permission of instructor.

THE 1410 Technical Production**4 QH**

Allows the opportunity to acquire and explore the requisite skills for developing working drawings and budgetary analyses for theatrical productions. Focuses on several projects and includes the opportunity to coordinate one substantial production. Requires that the specialized study be executed in close supervision with the instructor. *Prereq.* All courses in production/design concentration and permission of instructor.

THE 1420 Advanced Drafting and Construction**4 QH**

Offers specialized study in technical production techniques. Covers drafting procedures necessary for the conversion of designer's drawings into detailed rear elevation and construction layouts, as well as the development of section, isometric, and oblique views. Through a series of practical and project exercises, analyzes the various factors governing the construction and rigging of two- and three-dimensional scenery, linear-motion, rotary-motion, and elevating systems. Emphasizes theatrical problem solving with regard to safety, dependability, and economy. Lab fee. *Prereq.* THE 1209.

THE 1430 Lighting Design 2**4 QH**

Offers an intensive study of lighting design theory and practice. Expects students to design numerous lighting plots, sections, instrument schedules, and design concepts for various types of productions and spaces. Investigates and discusses current professional techniques and practices. *Prereq.* THE 1226.

THE 1505 Continental Drama**4 QH**

Covers seminal late nineteenth- and mid-twentieth-century continental drama. Focuses on playwrights whose plays had a major impact on modern drama and theatre.

THE 1510 Twentieth Century Theatre**4 QH**

Studies the history of the post-naturalistic theatre in Europe and the United States. Explores the work and influence of such figures as Craig, Appia, Meyerhold, Brecht, Artaud, Grotowski, Beck and Molina, Schechner, and Chaiken.

THE 1800, THE 1801, THE 1802, THE 1803 Practicum in Production**1 QH each**

Offers lab practice in technical production; can be repeated for credit (maximum four credits). *Prereq.* Departmental permission.

THE 1810, THE 1811, THE 1812, THE 1813**4 QH each****Junior/Senior Honors Project**

For details contact the honors office.

THE 1820, THE 1821, THE 1822, THE 1823 Directed Study**4 QH each****THE 1840, THE 1841, THE 1842, THE 1843, THE 1844, THE 1845, THE 1846, THE 1847, THE 1848, THE 1849****4 QH each****Special Topics in Theatre Performance**

Offers opportunity for in-depth examination of a subject of particular significance to the field.

THE 1860, THE 1861, THE 1862, THE 1863, THE 1864, THE 1865, THE 1866, THE 1867 Special Topics in Theatrical Design**4 QH each**

Offers opportunity for in-depth examination of a subject of particular significance to the field.

THE 1890, THE 1891, THE 1892, THE 1893**4 QH each****Special Topics in Theatre History/Dramatic Criticism**

Offers opportunity for in-depth examination of a subject of particular significance to the field.

Business Administration

Accounting

ACC 1111 Accounting Principles 1

4 QH

Covers the nature, function, and environment of accounting; the basic accounting model; financial and analytical ratios; the evaluation of accounts receivable; the control of inventory; the acquisition, disposal, and depreciation of plant and equipment; short- and long-term debt financing; and corporate stockholder equity. This first of a series of accounting courses assumes students do not possess knowledge of the subject. Both this course and ACC 1112 are designed to help provide an understanding of accounting issues and objectives for proper interpretation and analysis of financial accounting information. *Prereq.* *Sophomore standing.*

ACC 1112 Accounting Principles 2

4 QH

Introduces students to managerial accounting reports and decisions through class discussions, exercises, and demonstration problems. Specific topics covered include the statement of cash flows; ratio analysis; cost measurement and behavior; cost-volume-profit analysis; budgeting and variances; and relevant costs for decisions. *Prereq.* *ACC 1111 and sophomore standing.*

ACC 1331 Intermediate Accounting 1

4 QH

Constitutes the principal foundation course for accountants; includes a comprehensive review of the conceptual framework of accounting. Emphasizes the preparation of financial statements and their use in decision making. Stresses the development of accounting theory in the analysis of alternative accounting treatments and procedures. Pays particular attention to cash, accounts receivable, and inventories. *Prereq.* *ACC 1111 or equivalent and middler standing.*

ACC 1332 Intermediate Accounting 2

4 QH

Continues the study of accounting principles, concepts, and procedures introduced in ACC 1331. Emphasizes the conceptual aspects of measuring and reporting liabilities and alternative accounting treatments and procedures. *Prereq.* *ACC 1331 and middler standing.*

ACC 1339 Cost Accounting

4 QH

Develops understanding of the critical role of cost measurement in business decisions and in managing a firm's profitability. Studies alternate ways of measuring costs to meet different management objectives, the role of budgeting as a planning and management tool, and the use of cost analysis as a control tool to help management meet short- and long-term profit objectives. *Prereq.* *ACC 1112 and middler standing.*

ACC 1343 Intermediate Accounting 3

4 QH

Completes the intensive study of measurement and reporting issues of modern accounting practice. Emphasizes the conceptual and procedural aspects associated with the reporting of stockholders equity, earning per share, and deferred taxes. *Prereq.* *ACC 1332 or permission of instructor.*

ACC 1345 Accounting Systems

4 QH

Examines the process of analyzing and designing financial accounting systems. Uses a conceptual approach to consider the appropriate use of computer technology in designing new systems. Covers system analysis and design concepts, files and data-

base design, and how to control specific accounting applications. Provides hands-on experience in operating a computerized accounting system. *Prereq.* *ACC 1331, introductory computer course, or permission of instructor, and middler standing.*

ACC 1347 Auditing

4 QH

Examines audit concepts, standards, and procedures, including the auditor's legal and ethical responsibilities, the auditing profession, auditing standards, code of professional conduct, auditor's reports, evidence, internal control structure, statistical sampling, legal liability, and substantive testing. *Prereq.* *ACC 1332 or ACC 1343.*

ACC 1351 Federal Income Taxes 1

4 QH

Emphasizes basic understanding of the federal income tax structure relating to individuals. Requires completion of tax return problems and research cases directed at addressing various tax situations. Through these projects, the different sources of tax authority are introduced. *Prereq.* *ACC 1332 or permission of instructor.*

ACC 1512 Federal Income Taxes 2

4 QH

Continues the examination of the federal income tax system. Emphasizes the tax implications of property transactions and choice of business entity. Transactions between owners and business entities are also examined. A major emphasis is given to tax planning considerations, especially corporate tax consequences. *Prereq.* *ACC 1351.*

ACC 1521 Advanced Accounting

4 QH

Analyzes accounting theory and practice in various areas for the student planning a career as a professional accountant. Includes accounting for partnerships; business combinations and consolidated financial statements; bankruptcy, liquidation and reorganization; accounting for multinational enterprises; segments, interim reporting, and reporting to the SEC; and accounting for governmental units. *Prereq.* *ACC 1343 or permission of instructor.*

ACC 1591 Independent Study

1 QH

Allows students who have received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study will take place. A copy of the final report prepared by the student will be presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from area coordinators.

ACC 1592 Independent Study

2 QH

Same as ACC 1591.

ACC 1593 Independent Study

3 QH

Same as ACC 1591.

ACC 1594, ACC 1595, ACC 1596, ACC 1597 Independent Study

4 QH

Same as ACC 1591.

ACC 1711 Accounting Principles 1 (Honors)

4 QH

See course description for ACC 1111.

ACC 1712 Accounting Principles 2 (Honors)

See course description for ACC 1112.

ACC 1891 Honors Thesis in Progress**ACC 1892 Honors Thesis****ACC 1893 Honors Thesis in Progress****ACC 1894 Honors Thesis****4 QH****0 QH****8 QH****0 QH****12 QH**

requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study will take place. A copy of the final report prepared by the student will be presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from area coordinators.

ENT 1592 Independent Study**2 QH**

Same as ENT 1591.

ENT 1593 Independent Study**3 QH**

Same as ENT 1591.

ENT 1594, ENT 1595, ENT 1596, ENT 1597 Independent Study**4 QH**

Same as ENT 1591.

ENT 1598 Independent Study**8 QH**

Same as ENT 1591.

ENT 1891 Honors Thesis in Progress**0 QH****ENT 1892 Honors Thesis****8 QH****ENT 1893 Honors Thesis in Progress****0 QH****ENT 1894 Honors Thesis****12 QH**

Entrepreneurship

ENT 1330 Entrepreneurship**4 QH**

Introduces entrepreneurship, focusing on the following questions: What is entrepreneurship and how do you become an entrepreneur? How do you find or create ideas that might become businesses? How can you determine if the ideas have merit in the marketplace? How do you start a firm that, from the beginning, is market oriented and focused on what customers need and are willing to buy? Gives students an opportunity to conduct detailed evaluations of new business ideas.

ENT 1344 Starting and Managing a New Business**4 QH**

Identifies the key principles and practices needed to start a business from the initial idea to the management of profits and further expansion. Covers such topics as alternative approaches to business entry, initial team building, managing interactions with initial customers, establishing control systems, legal matters, and building necessary external relationships. Gives students an opportunity to analyze a new venture.

ENT 1352 Planning and Growing New Ventures**4 QH**

Focuses on how entrepreneurs turn small businesses into larger businesses. Includes planning, forecasting sales, increasing production, designing new products or services, designing distribution and managing a sales force, managing personnel, using strategic linkages with other companies to increase market presence, and working with a growing customer base. Discusses how to manage a small firm in hard financial times. Offers students an opportunity to develop comprehensive business plans for new or existing businesses as term projects.

ENT 1358 Small Business Institute**8 QH**

Provides students with an opportunity to apply their business training through an analytical, problem-solving technique learned in the classroom. Expects student teams to interact with owners and managers of local small businesses to analyze problems and opportunities and develop recommendations, and to devote the equivalent of two days per week to collecting information. Combines experience with occasional class meetings and frequent team meetings with a faculty member. Sponsored by the United States Small Business Administration (SBA). Requires students to present interim progress reports and final written and oral reports to the client company and the SBA. *Prereq.* Junior standing or permission of instructor.

ENT 1591 Independent Study**1 QH**

Allows students who have received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal

Finance and Insurance

FIN 1201 Personal Finance**4 QH**

Focuses on management of the total personal estate: budgeting, savings, insurance, investments, borrowing, taxes, Social Security, pensions, annuities, securities markets, mutual funds, and their integration. *Not open to College of Business Administration students.*

FIN 1333 Financial Institutions and Markets**4 QH**

Explores the financial environment faced by a firm as well as the financial institutions serving the economy. Discusses the forces that determine the changes in money and capital markets and explores the implications of changing financial environment for the management of funds in a firm and/or financial institution. *Prereq.* ACC 1112 and middler standing.

FIN 1335 Managerial Finance**4 QH**

Provides students the opportunity to gain knowledge of the advanced tools and concepts used in the management of funds. Topics include inventory and credit policies, risk, capital budgeting, financial structure, cost of capital, dividend policy, and valuation of a firm. Overall financial strategy and timing of its implementation are also examined. Specialized topics—mergers and acquisitions, financial failure, and financial policy for multinational firms—may be considered in the course. *Prereq.* FIN 1439.

FIN 1346 Investment Management**4 QH**

Presents a broad overview of the concepts, practices, and procedures of investment management. Covers basic security types, security market operations, security analysis (both fundamental and technical), and an introduction to portfolio management. *Prereq.* FIN 1439.

FIN 1438 Principles of Finance 1**4 QH**

Familiarizes students with the concepts, tools, practices, and procedures in financial management. Covers capital budgeting, valuation, time value of money, financial planning, analysis, and risk management. Uses problems, case discussions, spreadsheet analysis, and other computer-based teaching tools to enhance student understanding of financial concepts. *Prereq.* ACC 1111, MSC 1200, and middler standing.

FIN 1439 Principles of Finance 2**4 QH**

Introduces students to financial markets and financial institutions. Familiarizes students with security market operations and financial assets. Covers interest rate theory, risk and return, diversification, and equilibrium models of the risk-return trade-off. Uses problems, case discussions, spreadsheet analysis, and other computer-based teaching tools to enhance student understanding of financial concepts. *Prereq.* ACC 1112, MSC 1201, and middler standing.

FIN 1503 Taxes and Financial Decisions**4 QH**

Uses the case method to discuss a number of financial decisions that are greatly influenced by tax considerations, the most important of which are concerned with capital structure, dividend policy, acquisition terms, investment policies, and liquidations. The federal income tax receives primary consideration, but state and foreign taxes are also discussed. *Prereq.* FIN 1439 and middler standing.

FIN 1520 Options and Futures Markets**4 QH**

Explores the relatively new concepts of financial futures, options on financial futures, and listed options markets as developed to help corporations and financial institutions manage interest-rate risk. Topics include mechanics of these markets, techniques that can hedge interest rate exposure, tracing methods, and current developments in the field. *Prereq.* FIN 1346.

FIN 1526 Securities Markets**4 QH**

Analyzes the operation of the securities market. Provides students the opportunity to examine in detail the operation and function of investment bankers, broker-dealers, and securities exchanges. Studies the mechanics of cash and margin accounts, trading options, and regulations affecting securities markets. *Prereq.* FIN 1439.

FIN 1530 Working Capital Management**4 QH**

Examines strategies and analytical approaches to managing current assets and current liabilities. Explores corporate cash management under changing money market conditions. Discusses the use of interest rate futures and working capital management in a multinational context. *Prereq.* FIN 1439.

FIN 1531 Capital Investment Decision Analysis**4 QH**

Analyzes capital budgeting techniques and portfolio considerations, including risk analysis, capital structure and valuation, and other long-term corporate finance topics. *Prereq.* FIN 1439.

FIN 1538 Financial Ethics**4 QH**

Investigates and helps develop a systematic understanding of ethical dilemmas of financial business decision making. Examines the influence of business cultures on personal behavior, combining wisdom of the past with current ethical thinking and each individual's standards. *Prereq.* FIN 1438.

FIN 1540 Management of Financial Institutions**4 QH**

Studies the decision-making problems faced by financial institutions such as commercial banks, savings and investment institu-

tions, and finance companies when viewed as competitive, profit-seeking business entities. Covers such topics as the nature and scope of the capital markets confronting institutions, specialized problems regarding the sources and uses of funds of financial institutions, the nature of competition, the regulation of financial institutions, and strategic policy planning of financial institutions. *Prereq.* FIN 1439 or FIN 1333.

FIN 1543 Modern Portfolio Management**4 QH**

Analyzes the methods of selection, revision, and performance measurement of asset portfolios. Exposes the students to the current methods of building an asset portfolio. Presents and evaluates the concept of the efficient frontier of assets in the risk-return space. Includes a simulated equity fund-management project, in which students select equity securities and then prepare and present annual reports evaluating their portfolios' construction and performance. *Prereq.* FIN 1346.

FIN 1544 Bank Management**4 QH**

Examines the financial management of commercial banks and thrift institutions. Analyzes the problems of liquidity and investment management, loan portfolio and capital management, and pricing problems associated with various sources and uses of funds in the context of changing economic and regulatory environment for these institutions. Presents lectures, discussions, and cases. *Prereq.* FIN 1439 or FIN 1333.

FIN 1545 Investment Banking**4 QH**

Focuses on the managerial functions of investment banking firms. Examines individual investors and institutions in the money and capital markets from the viewpoint of investment banking firms. Familiarizes students with the operating and cash flow characteristics of institutional and individual clients. *Prereq.* FIN 1439.

FIN 1549 Principles of Real Estate**4 QH**

Surveys the field of real estate, including principles of real estate law, valuation, brokerage, finance, land use, and negotiations. Gives the student the opportunity to become a better decision maker and to prepare for future studies in real estate. *Prereq.* FIN 1439.

FIN 1550 Real Estate Finance: Analysis and Investment**4 QH**

Presents real estate financing techniques, sources of funds, and investment property analyses. Examines the legal and financial aspects of such techniques as mortgage liens, leaseholds, contracts for deed, and sale-leasebacks, as well as the primary and secondary mortgage markets. Surveys methods of valuing income properties. *Prereq.* FIN 1549.

FIN 1562 Employee Benefits Management**4 QH**

Covers the design, implementation, and financing of corporate employee benefit plans. Presents a comprehensive analysis of qualified and non-qualified benefit and executive compensation plans. Emphasizes the proper management, design, and financing of these plans to achieve corporate goals at minimum feasible cost. Studies alternative methods of financing benefit and executive compensation plans. Includes recent developments in Social Security, benefits, and tax legislation. *Prereq.* FIN 1439.

FIN 1566 Risk Management and Insurance**4 QH**

Emphasizes the functional area of corporate risk management. Covers such areas as organizing and controlling the risk management function; identifying, measuring, controlling, and financing risk; selecting the best method of risk treatment; and implementing

and monitoring risk management. Topics of exposure analysis include property, liability (public, employer, products, officers and directors, and professionals), income, and extraordinary expense losses. Covers treatment methods such as self-insurance, off-shore captive, retention groups, and commercial insurance. Includes recent developments such as tort reform integration of risk management with modern financial theory, as well as implications and analysis of recent tax reforms. *Prereq.* FIN 1439.

FIN 1580 Personal Financial Management 4 QH
Emphasizes the development of personal financial management expertise, based on an integrated plan for personal choices. Focuses on an overall personal economic plan and unites such diverse topics as inflation and investment selection, insurance, short- and long-run hedges against the purchasing power risk, and purchasing assets. Encourages decision making through analyzing alternative courses of action. *Prereq.* FIN 1438.

FIN 1582 Personal Insurance Planning 4 QH
Focuses on the informed decisions necessary to establish a comprehensive, rational plan of personal insurance. Examines through class discussion, lectures, and readings the various kinds of personal insurance and how to create an insurance package for clients with different insurance needs. *Prereq.* FIN 1438.

FIN 1591 Independent Study 1 QH
Allows the student who has received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study will take place. A copy of the final report prepared by the student will be presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from area coordinators.

FIN 1592 Independent Study 2 QH
Same as FIN 1591.

FIN 1593 Independent Study 3 QH
Same as FIN 1591.

FIN 1594, FIN 1595, FIN 1596, FIN 1597 Independent Study 4 QH each
Same as FIN 1591.

FIN 1738 Principles of Finance 1 (Honors) 4 QH
Acquaints students with basic processes, principles, tools, and concepts of finance. Topics include financial analysis, financial forecasting, profit planning, budgeting, working capital management, and capital budgeting. Covers the basics of financial markets, institutions, and sources of supply of different types of funds available to a firm. *Prereq.* ACC 1112, MSC 1201, and middler standing.

FIN 1739 Principles of Finance 2 (Honors) 4 QH
Continues FIN 1738. Builds upon the basic set of analytical tools and stresses application. Covers advanced capital budgeting, cost of capital, and long-term financing. Examines the implications of a firm's choice of capital structure and dividend policies. *Prereq.* FIN 1438 or FIN 1738.

FIN 1759 International Financial Markets 4 QH
Introduces international financial markets, including balance of payments, history of the international monetary system, exchange-rate determination, foreign-exchange-exposure hedging strategies, and international capital markets. Emphasizes how international financial markets work and how corporations must adapt their decision-making to the international environment. *Prereq.* FIN 1439.

FIN 1760 International Financial Management 4 QH
Examines how the financial strategies and policies of multinational corporations differ from domestic corporations and how financial management is utilized in an international setting to achieve corporate goals. Specific topics include cost of capital, capital budgeting, capitalization policies, and management techniques for dealing with exchange-rate exposure and working-capital issues. Knowledge of exchange rates is assumed. *Prereq.* FIN 1759.

FIN 1770 Small-Business Finance 4 QH
Uses basic processes, principles, tools, and concepts of finance within the parameters of a small business to develop a complete financial plan that projects the future circular flow of funds by analyzing and then integrating the impact of both investment decisions (use of funds) and financial decisions (source of funds). *Prereq.* FIN 1439.

FIN 1814 Financial Forecasting 4 QH
Discusses how accurate forecasts of product demand, retail sales, and cash-flow levels are critically important for companies regardless of size. Covers how effective financial forecasting integrates macroeconomic factors, particularly the business cycle, and institutional factors with appropriate quantitative methods. Addresses both issues—economic or business cycles and forecasting techniques—in sufficient depth so that students can obtain the skills necessary to build and interpret a basic forecasting model for business. *Prereq.* Honors participation or permission of instructor.

FIN 1816 Economic Decision Making in the Global Environment (Honors) 4 QH
Simulates global competition to enable students to develop and execute a strategy to propel their company to the top ranks in the US, Europe, and Asia. Considers such issues as new product development, selection of product attributes, calculation of demand, least-cost financing of investments, fluctuating foreign exchange rates, cost-minimizing versus product differentiation strategies, and aggressive versus defensive posturing. Emphasizes “winning” the competitive battle in terms of key economic variables while attempting to satisfy stakeholders and avoid interference by government antitrust authorities. *Prereq.* Honors participation or permission of instructor.

FIN 1818 Turnaround Management (Honors) 4 QH
Examines strategies for identifying companies likely to fail and selecting and implementing remedial actions. Covers such topics as business turnarounds, troubled companies, workouts, bankruptcies, and liquidations, using case studies and readings. Students will evaluate a turnaround plan. *Prereq.* Honors participation or permission of instructor.

FIN 1891 Honors Thesis in Progress 0 QH

FIN 1892 Honors Thesis 8 QH

FIN 1893 Honors Thesis in Progress 0 QH

FIN 1894 Honors Thesis 12 QH

Human Resources Management

HRM 1332 Introduction to Human Resources Management 4 QH

Helps students develop understanding of contemporary issues in human resource management. Examines problems posed by changing work patterns, labor force characteristics, union activities, and government policies. Discusses and evaluates organizational experiments such as worker participation, job enlargement, and group incentives from a managerial perspective. *Prereq. Middler standing.*

HRM 1345 Contemporary Labor Issues 4 QH

Studies current issues dealing with labor in its broadest sense. Discusses and evaluates labor unions and manpower institutions as well as the emerging development and training problems motivated by unemployment, poverty, and changing work patterns. Reviews recent legislation dealing with the employment relationship. *Prereq. Middler standing.*

HRM 1348 Reward Systems: Wage, Salary, and Benefits Administration 4 QH

Examines one of the major functions of personnel administration—compensation management—and its part in the overall personnel programs of the organization. Develops through simulation exercises, group projects, lectures, and cases an analysis of reward systems as supportive mechanisms of management and the formulation of compensation policy and implementation of compensation systems. *Prereq. Middler standing.*

HRM 1349 Selection and Assessment of Employees 4 QH

Examines three influences of employee selection and testing: the legal aspect of selection, where the greatest uncertainty is found; the influence of industrial psychology on selection and decision-making techniques; and the area of personnel practices itself, that is, the methods employers find effective in coping with legal requirements. Covers basic issues and procedures such as EEO, decision strategies, and the utility and evaluation of selection and appraisal systems. *Prereq. Middler standing.*

HRM 1350 Skills of Leading and Managing 4 QH

Examines the evolving role of managers in improving organization effectiveness. Examines the emerging nature of the work force, new technology and human resource alliances, linking human resources with business strategy, managerial applications of system thinking, effecting continuing organizational change, and building learning organizations. *Prereq. HRM 1431 and HRM 1432, or HRM 1433.*

HRM 1432 Organizational Behavior 4 QH

Explores the effects of individual, interpersonal, group, and leadership factors on human behavior. Also explores managerial applications of behavioral and social science concepts, including job design, job satisfaction, performance appraisal, supervision, career dynamics, and organizational change. Emphasizes helping the student develop skills in dealing with the human side of enterprise. *Prereq. Middler standing. (Not open to College of Business Administration students.)*

HRM 1433 Organizational Behavior and Design 8 QH

Covers the material from HRM 1431 and HRM 1432. The structure and dynamics of the complex organization are examined, focusing on the design of the organization and its basic subsystems. The effects of individual, interpersonal, group, and leadership factors on human behavior are also examined. Students have the opportunity to explore how organizational structures help shape

human behavior and to develop skills in dealing with the human side of enterprise. *Prereq. Middler standing.*

HRM 1508 Participative Management 4 QH

Examines participative management, a range of techniques that may enhance employee involvement in decision making. Studies the motivational basis for participative programs, describes the forms and techniques available, and examines criteria for evaluating effectiveness. Considers internal and external organizational factors that may affect overall success of participation and discusses cultural and social aspects of participative management in an international business environment. *Prereq. Middler standing.*

HRM 1510 Managing and Surviving in Turmoil and Transition 4 QH

Focuses on the business environment of today and tomorrow and what effective management will require to create adaptive, flexible, self-correcting, and constantly improving organizations—a set of tools that will become standard equipment in tomorrow's organization. These tools will include understanding the complex interaction among systems, structures, and practices as well as provide the techniques needed to facilitate transition, growth, adaptation, and organizational learning. Focuses on the topic areas of work teams, participative management, managing and surviving change, creating a climate for innovation, and building group and organizational commitment.

HRM 1517 Managing Power and Influence 4 QH

Examines the effective use of power and political processes in organizations. Considers the philosophical and social psychological foundations of social influence strategies and tactics, and develops clinical skills for seeing, recognizing, and utilizing these strategies and tactics in ways that are organizationally effective and socially responsible. Presents information with the expectation that familiarity and sensitivity to the dynamics surrounding the use of power and influence will provide both insulation and awareness for students as they deal with these issues in their managerial careers.

HRM 1519 Leadership 4 QH

Studies the leadership function in a variety of organizational settings. Uses a contingency approach to help students explore a range of possible leadership behaviors, relating the appropriateness of a particular style to a number of situational factors. Readings provide an opportunity to explore several contingency theories of leadership; cases allow for the application of these models; and videotaped role playing and self-assessment techniques permit students to evaluate their own leadership style. *Prereq. Middler standing.*

HRM 1539 Managing Careers 4 QH

Surveys the tools for both self-assessment (investigating one's skills, abilities, needs, values, and interests) and career exploration (determining the nature of and requirements for entering and succeeding in various career fields). Helps students develop an individualized plan of action that summarizes a wide variety of data indicating an individual's present status and career goals and the means by which to bridge the gap. *Prereq. Middler standing.*

HRM 1581 Managerial Skills Seminar 4 QH

Studies and develops specific behavioral and interpersonal skills critical for managerial success, particularly those most vital early in management careers, in a seminar/workshop format. Uses introspective and experiential exercises and role plays extensively and discusses specific work assignments. *Prereq. Middler standing.*

HRM 1585 Managing Human Resources: The Legal Environment 4 QH
Studies the recent legal developments affecting the management of human resources. Examines recent state and federal laws that will influence managerial policies and practices in areas such as employment testing, hiring and promotion, controlling unemployment compensation and Worker's Compensation claims, and responding to OSHA and ERISA regulations. *Prereq. Middler standing.*

HRM 1591 Independent Study 1 QH
Allows a student who has received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study will take place. A copy of the final report prepared by the student will be presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from area coordinators.

HRM 1592 Independent Study 2 QH
Same as HRM 1591.

HRM 1593 Independent Study 3 QH
Same as HRM 1591.

HRM 1594, HRM 1595, HRM 1596, HRM 1597 4 QH each
Independent Study
Same as HRM 1591.

HRM 1760 International Labor Relations Systems 4 QH
Analyzes labor relations systems of selected countries in comparison with that of the United States. Also studies the political, cultural, and economic forces that shaped these systems. Gives special attention to such international institutions as multinational companies and the EEC. Cases, readings, and projects assigned. *Prereq. Middler standing.*

HRM 1762 Managing People in International Settings 4 QH
Covers basic issues in human resources management relevant to managing in international and cross-cultural environments. Examines selection and training of personnel for work in multicultural environments, managing the international employee in the United States and abroad, cross-cultural communication, international environments, special issues of concern to small business, and change in multinational companies. *Prereq. Junior standing.*

HRM 1814 Managing Ethical Dilemmas in Business (Honors) 4 QH
Considers the ethical dilemmas that arise for managers whenever individual goals collide with larger responsibilities to the community, co-workers and employees, and the organizations to which they belong. Aims to increase awareness of, ability to analyze, and skills to cope with the often conflicting responsibilities and alternatives that underlie managerial dilemmas. Uses a seminar approach to explore managerial dilemmas across functional areas and to develop applied case scenarios. *Prereq. Honors participation or permission of instructor.*

HRM 1891 Honors Thesis in Progress 0 QH

HRM 1892 Honors Thesis 8 QH

HRM 1893 Honors Thesis in Progress 0 QH

HRM 1894 Honors Thesis 12 QH

International Business Administration

INB 1338 Introduction to International Business 4 QH
Focuses on the cultural, economic, and political aspects of domestic and foreign environments and their effect on the international operations of business firms. Topics include the principles, patterns, and potential of international trade and investments; the development of management strategies for international businesses; and the organization and management of the firm's international operations. *Prereq. Middler standing.*

INB 1352 Seminar in International Business 4 QH
Applies the concepts and skills acquired in other international and domestic courses. Focuses on solving managerial problems in international and multicultural contexts. Uses case analysis to focus on business strategy and policy related to international operations. Requires significant class participation, written analysis, and understanding of current issues. *Prereq. INB 1338 and senior standing.*

INB 1731 Cultural Aspects of International Business 4 QH
Covers, from a managerial perspective, issues that arise when a firm moves from its home country to a host country that has a different national culture. Focuses on United States-based firms that operate abroad. Also considers what happens to other nation's firms operating in the United States and in third-country environments. Analyzes how "corporate culture" evolves in the context of national culture and the impact on managers. *Prereq. Middler standing.*

INB 1735 Import and Export Management 4 QH
Covers the principles and practices of international trade through import and export. Focuses on management aspects and explores details required to engage all aspects of international trade. Topics include government regulations, transportation, insurance, marketing, and finance.

Management

MGT 1115 Introduction to Business 4 QH
Introduces the basic functions of management, team-taught by faculty from all areas of the College of Business Administration. Examines academic choices and career opportunities in business.

MGT 1345 Legal Aspects of Business 4 QH
Examines the legal aspects of business transactions and business relationships involving contracts and sale of goods under the Uniform Commercial Code, as well as product liability and agency law.

MGT 1446 Managing Social Issues**4 QH**

Focuses on the legal, social, ethical, and economic influences as well as domestic and international cultural factors affecting business. Treats various ways the manager can respond to these influences. Topics include the several possible models of the business and society relationship; the foundations of personal and managerial ethics; the business, government, and society interrelationships; ways the manager can address various stakeholder interests; and strategic and corporate public policy consequences of management's responses to specific social issues. *Prereq. Junior standing.*

MGT 1450 Business Policy**4 QH**

Focuses on corporate strategy and its elements, including an analysis of the company, its resources, opportunities, environment, and decision makers. Emphasizes decision making and implementation of strategy while operating a company in the context of a business simulation. *Prereq. Senior standing.*

MGT 1572 Law of Wills, Trusts, and Estates**4 QH**

Examines requirements of valid will, claims of and against estates; the administration of estates, both formal and informal; essential elements for the creation of a trust; kinds of trusts, including inter vivos and testamentary trusts; the rights, responsibilities, and liabilities of trustees; and the rights of beneficiaries. *Prereq. Middler standing.*

MGT 1573 Bulk Sales and Bankruptcy**4 QH**

Examines bulk transfers, with detailed study of the Uniform Commercial Code, Article 6; the need of the transferor to give to the transferee a sworn list of all his creditors; the giving of notice to the listed creditors; the contents of the notice, what creditors are protected; and the legal consequences of failure to comply with the Code. Also deals with both voluntary and involuntary bankrupts; the appointment and duties of the trustee; provable and dischargeable debts; priority of debts; discharge and acts that bar a discharge. *Prereq. Middler standing.*

MGT 1574 Law in Society**4 QH**

Provides students the opportunity to acquire a broad view of their legal rights, obligations, and responsibilities in their relations with others and with the state. Includes study of torts, such as assault and battery, trespass, negligence, slander, libel, and deceit, and crimes such as homicide, assault and battery, robbery, arson, larceny, and burglary. *Prereq. Middler standing.*

MGT 1575 Negotiations**4 QH**

Focuses attention on the strategies and techniques employed in the negotiations process. Includes familiarization with related literature, student role-playing, and interaction with professionals involved in private and public sector negotiations.

MGT 1580 Intercultural Negotiation and Conflict**4 QH**

Focuses on effective management in multicultural environments and the need for negotiating skills beyond basic bargaining tools. Considers such psychological and sociological factors as stereotyping, discrimination, biculturalism, intercultural conflict, cultural factors in negotiation, and cultural hegemony. Provides the opportunity to apply these and related ideas to such practical situations as negotiating relationships among intercultural groups, negotiating across cultures, and understanding relationships between competing cultures.

MGT 1591 Independent Study**1 QH**

Allows the student who has received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study will take place. A copy of the final report prepared by the student will be presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from area coordinators.

MGT 1592 Independent Study**2 QH**

Same as MGT 1591.

MGT 1593 Independent Study**3 QH**

Same as MGT 1591.

MGT 1594, MGT 1595, MGT 1596, MGT 1597 Independent Study**4 QH each**

Same as MGT 1591.

MGT 1720 Labor Law**4 QH**

Helps acquaint the student with the many constitutional and legal problems involved in labor organizing, industrial relations, labor negotiations, labor contract enforcement, and dispute resolution. Examines cases for the legal principles underlying the common law, state and federal laws, and the constitutional questions of power and authority. Also considers the Sherman Act, Clayton Act, Norris-LaGuardia Act, and Labor Management Relations Act. *Prereq. Middler standing.*

MGT 1820 Independent Study (Honors)**4 QH**

Offers directed study toward fulfillment of Honors Program requirements and is open only to students who have been accepted into the Honors Program. Procedures for arranging the honors independent study are the same as those for MGT 1594.

MGT 1831 International Competitiveness in a Global Economy**4 QH**

Introduces students to the evolution and growing interdependence of the global economy, especially the increasing number of regional trading arrangements such as NAFTA, GATT, APEC, and Mercosur. Analyzes the international competitiveness issues addressed in such arrangements to show students how governments influence national and world economies as well as the global competitiveness of an individual corporation. Includes readings, case studies, and guest speakers. May entail one or two overnight field visits within the United States and/or Canada over a weekend. *Prereq. Honors participation or permission of instructor.*

MGT 1832 Managing Product Innovation in Large Companies (Honors)**4 QH**

Introduces conventional, single-product approaches to product development and then considers innovation from a series of broader managerial and technological perspectives, combining theory and applications. *Prereq. Honors participation or permission of instructor.*

MGT 1838 Corporate Renewal through New Product Development**4 QH**

Provides an overview of the key issues facing technology-based firms. Addresses the following challenges from the perspectives of both the small start-up and the large corporation seeking to

renew itself: the threat of technological discontinuities for existing business; the renewal of product architectures; identifying and understanding markets for new technologies; the linkage between design and manufacturing to achieve value cost advantage; and applications of product concepts to software, information products, and services. *Prereq.* Honors participation or permission of instructor.

MGT 1891 Honors Thesis in Progress 0 QH

MGT 1892 Honors Thesis 8 QH

MGT 1893 Honors Thesis in Progress 0 QH

MGT 1894 Honors Thesis 12 QH

Management Science

MSC 1200 Business Statistics 1 4 QH

Studies statistics, which is the methodology concerned with data collection, analysis, and interpretation. Discusses the information that is generated by statistical methods and used for analyzing decisions in the face of uncertainty. Introduces fundamental concepts and methodology of statistics, probability distribution, estimation, and hypothesis testing. *Prereq.* MTH 1114.

MSC 1201 Business Statistics 2 4 QH

Continues topics covered in MSC 1200. Includes chi-square tests, simple and multiple regression-correlation analysis, and elementary concepts of time series analysis. *Prereq.* MSC 1200.

MSC 1226 Introduction to Computer Applications in Business 4 QH

Introduces personal computers with business applications, as well as microcomputers, spreadsheets, word processing, and databases. Covers the basic information systems concepts. Requires students to analyze a business case, applying their technology and problem-solving skills.

MSC 1330 Data Management 4 QH

Builds on the functional skills learned in MSC 1226. Exposes students to the essentials of data management. Topics include database design, selection and use of a database software package, database administration security, privacy, and data recovery. *Prereq.* MSC 1226.

MSC 1332 Decision Support Systems for Business 4 QH

Provides students with an understanding of the impact of computer-based tools on business decision making. Builds upon the computer literacy foundation established in MSC 1226. Covers decision support software such as graphics and expert systems on both mainframe and microcomputers. Gives students the opportunity to build a decision support system and create the supporting system documentation and user manual in a course project. *Prereq.* MSC 1226.

MSC 1335 Telecommunications and Networks 4 QH

Reviews business telecommunications. Focuses on the design, use, and management of networks. Topics include telecommunications technology, network structures, and current telecommunication applications in business such as electronic mail, teleconferencing, and distributed applications. *Prereq.* MSC 1226.

MSC 1336 Business Programming 4 QH

Provides students with experience in structured reasoning and programming. Builds upon the skills mastered in MSC 1330; utilizes an object-oriented language such as Microsoft Access Basic. Gives students the opportunity to gain an appreciation for design, coding, debugging, and executing program modules. Emphasizes the design discipline required to create such modules and the productivity gain that can be realized by employing object modules of this type in a business setting. *Prereq.* MSC 1226, MSC 1330.

MSC 1341 Information Resource Management 4 QH

Examines the major organizational and managerial issues associated with managing the information resource focusing on three thematic components. Gives students the opportunity to assume a strategic viewpoint and consider using information to achieve competitive advantage, create new products or services, or to re-engineer the business; learn about using information technology to support the functional areas of the business such as finance, manufacturing, or human resources; consider issues related to managing information technology such as outsourcing IS applications, project management, and investing in new technology. *Prereq.* MSC 1226 and junior standing.

MSC 1342 Business Systems Integration 4 QH

Explores strategies for the functioning integration of information systems in both the office and the factory. Explores strategies for systems integration through a project requiring students to form companies, analyze their data needs, design and build a set of information systems, and recommend a strategy for data architecture integration. This is the capstone course for the MIS concentration. *Prereq.* MSC 1226, MSC 1330, MSC 1332, MSC 1335, MSC 1341. *Suggested* MSC 1336.

MSC 1433 Quantitative Models in Business 4 QH

Focuses on the construction of appropriate mathematical models (simplified representations or abstractions of reality) for managerial decision-making problems. Discusses criteria for selecting various stochastic and deterministic models. Covers decision trees, decision analysis, linear programming, and simulation. *Prereq.* MSC 1201.

MSC 1441 Operations Management 4 QH

Considers the productive system of an enterprise whereby inputs of technology, materials, personnel, and information are transformed into useful goods and/or services. Introduces the types of problems and issues encountered by the operations manager. Discusses various models and techniques but emphasizes problem formulation and managerial implications.

MSC 1553 Decision Analysis 4 QH

Focuses on the analysis of decision making, with particular emphasis on realistic problems under uncertainty. Aims to help improve the student's ability to make better decisions through a careful consideration of alternative courses of action and their consequences, relevant objectives, and the element of risk. Covers the basic components of decision problems, the concepts of risk and utility, decision trees, and value of information and multicriteria decision-making. *Prereq.* MSC 1201.

MSC 1566 Quality Management 4 QH

Examines the basic philosophy of quality and its management both in Japan and in the United States. Stresses the changing role of quality as an emerging strategic factor in the United States. Discusses managerial, behavioral, and statistical methods based

on measurement for achieving quality. Introduces the student to various aspects of quality management relevant to lower, middle and upper level of management; quality control circles; quality and continuous process improvements; and the philosophy of quality experts such as Deming, Juran, and Ishikawa. *Prereq.* MSC 1200, MSC 1201, and MSC 1441.

MSC 1591 Independent Study

1 QH

Allows the student who has received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study will take place. A copy of the final report prepared by the student will be presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from area coordinators.

MSC 1592 Independent Study

2 QH

Same as MSC 1591.

MSC 1593 Independent Study

3 QH

Same as MSC 1591.

MSC 1594, MSC 1595, MSC 1596, MSC 1597 Independent Study

4 QH each

Same as HRM 1591.

MSC 1700 Business Statistics 1 (Honors)

4 QH

See course description for MSC 1200.

MSC 1701 Business Statistics 2 (Honors)

4 QH

See course description for MSC 1201.

MSC 1726 Introduction to Data Processing (Honors)

4 QH

See course description for MSC 1226.

MSC 1826 Business Forecasting (Honors)

4 QH

Focuses on analyzing data using statistical models from various functional areas of business. Students prepare reports based on actual data that emphasize forecasting.

MSC 1828 Strategies for Environmentally Responsible Organizations

4 QH

Discusses how management decisions regarding product design, production methods, facility location and distribution channels, and service policies may have direct environmental consequences. Focuses on the operational strategies and tactics in manufacturing and non-manufacturing organizations that deal with environmental problems. Reviews federal and state environmental policy and legislation and examines the specific actions of producers and service producers. *Prereq.* Honors participation or permission of instructor.

MSC 1891 Honors Thesis in Progress

0 QH

MSC 1892 Honors Thesis

8 QH

MSC 1893 Honors Thesis in Progress

0 QH

MSC 1894 Honors Thesis

12 QH

Marketing

MKT 1331 Marketing Management

4 QH

Provides training in marketing decision making. Uses case studies simulating actual business settings to help students develop analytical abilities and sharpen their communications skills. Covers topics that range from techniques used to analyze a market to the development of a total marketing strategy (product policy, pricing policy, promotion policy, and distribution policy). *Prereq.* MKT 1435 and middler standing.

MKT 1341 Marketing Research

4 QH

Focuses on the survey research process and the analysis of data using "canned" computer programming routines. Covers topics such as problem definition, research design, sampling techniques, questionnaire development, data collection methods, and data analysis. Students expected to work on group projects. Requires no previous computer experience. *Prereq.* MKT 1331 and MSC 1201.

MKT 1351 Competitive Strategy

4 QH

A capstone marketing course, required of all students with a marketing concentration. Focuses on the formulation of marketing strategy at a policy level and its implementation in a dynamic environment. *Prereq.* MKT 1331 and senior standing.

MKT 1435 Introduction to Marketing

4 QH

Consists of lectures, readings, and small-group discussions on the role of marketing in contemporary society, in the business enterprises, and in the nonprofit organization. Considers the planning, operation, and evaluation of marketing and promotional efforts necessary to the effective marketing of consumer and industrial products and services in both profit and nonprofit organizations. *Prereq.* Middler standing.

MKT 1501 Introduction to Retailing

4 QH

Explores the range of retail firms that make up the retailing industry, from large mass merchandisers to small specialty outlets. Examines the functions, practices, and organizations of various store types. Considers such topics as current issues, career opportunities, the environment of retailing and retailing's role in the economy. *Prereq.* Middler standing.

MKT 1503 Retail Merchandising and Control

4 QH

Examines the concepts and techniques of store operations and merchandise management. Considers topics such as calculating and planning markups and markdowns, pricing, inventory control, stock turn, open-to-buy, profitability analysis, and expense control. *Prereq.* MKT 1435 or permission of instructor.

MKT 1523 Advertising Management

4 QH

Focuses on the management of the advertising function in relation to a firm's overall marketing objectives. Approaches the subject from the perspective of the user of advertising (for example, the product manager and the marketing manager). Uses case studies and text material to help the student develop decision-making skills. *Prereq.* MKT 1331 and middler standing.

MKT 1531 Sales Management

4 QH

Provides training in effective selling skills and how to manage accounts. Discusses how customers buy products and services and how this relates to a company's sales process: prospecting accounts, making sales presentations, handling customer objections,

closing sales, and post-sale servicing of accounts. Also covers current approaches such as relationship and partnership selling. *Prereq. MKT 1331 and middler standing.*

MKT 1542 Industrial Marketing 4 QH
Examines the marketing of products where business firms are the potential customers. Upperclass elective, open to juniors and seniors. *Prereq. MKT 1331 and middler standing.*

MKT 1545 New Product Development 4 QH
Focuses on the challenges and decisions managers face in creating, developing, launching, and managing new products and services. Special emphasis is given to the stages of the new product development process, the information needs in each stage, and approaches for gathering needed information. *Prereq. MKT 1331.*

MKT 1553 Foundations of Consumer Behavior 4 QH
Helps students develop an understanding of consumer attitudes and behavior processes as the basis of the design of marketing problems. Considers economic and behavioral models of consumer behavior and underlying behavioral theories and concepts. *Prereq. MKT 1331 and middler standing.*

MKT 1591 Independent Study 1 QH
Allows the student who has received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study will take place. A copy of the final report prepared by the student will be presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from area coordinators.

MKT 1592 Independent Study 2 QH
Same as MKT 1591.

MKT 1593 Independent Study 3 QH
Same as MKT 1591.

MKT 1594, MKT 1595, MKT 1596, MKT 1597 Independent Study 4 QH each
Same as HRM 1591.

MKT 1735 Introduction to Marketing (Honors) 4 QH
Explores the role of marketing in contemporary society, business enterprises, and nonprofit organizations through lectures, readings, and small group discussions. Considers planning, operating, and evaluating marketing and promotional efforts that are necessary to effectively market consumer and industrial products and services in both profit and nonprofit organizations. *Prereq. Middler standing and honors participation.*

MKT 1760 International Marketing 4 QH
Introduces those aspects of marketing that are unique to international business within the framework of traditional functional areas of marketing. Focuses on the environment and the modifications of marketing concepts and practices necessitated by environmental differences. Includes such topics as cultural dynamics in international markets, political and legal environmental constraints, educational and economic constraints, international marketing research,

international marketing institutions, and marketing practices abroad. *Prereq. MKT 1331 and middler standing.*

MKT 1891 Honors Thesis in Progress 0 QH
MKT 1892 Honors Thesis 8 QH
MKT 1893 Honors Thesis in Progress 0 QH
MKT 1894 Honors Thesis 12 QH

Logistics and Transportation

TRN 1333 The Domestic Transportation System 4 QH
Examines the structure, operations, and problems of the several modes of transportation, and outlines the government role in regulation and promotion. Also highlights the interaction between carriers and shippers in the transportation marketplace.

TRN 1335 Current Issues in Logistics and Transportation 4 QH
Identifies important contemporary issues and problems in logistics and transportation and examines their nature and significance. Explores alternative approaches to resolving such problems by analyzing various options and their implications.

TRN 1344 Business Logistics 4 QH
Analyzes the role and activities of those involved in corporate logistics decision making. Emphasizes the importance of transportation planning, inventory control, warehousing, customer service standards, and location decisions in the design and operation of distribution systems.

TRN 1352 Advanced Problems in Logistics and Transportation 4 QH
Identifies and examines important logistics and transportation issues that are of strategic importance to logistics professionals and carrier managers. Emphasizes the decision-making processes employed by top-level executives in the field. Focuses on the policy formulation process.

TRN 1353 Seminar in Transportation and Logistics 4 QH
Focuses on a limited number of advanced transportation/logistics topics. Offers students experience with business and government through individual research topics selected for class presentation/discussion. *Prereq. Senior standing or permission of instructor.*

TRN 1514 Carrier Management 4 QH
Examines the perspective of those involved in managing the several modes of transportation. Emphasizes the decision-making process related to such issues as carrier financing, pricing, labor relations, and equipment selection.

TRN 1528 Urban Transportation 4 QH
Focuses on the movement of people and freight in and around metropolitan areas. Examines the role of transit managers in planning, implementing, and operating mass transit systems. Also outlines how various governmental units participate in financing and regulating urban transportation.

TRN 1591 Independent Study 1 QH
Allows the student who has received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent

Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study will take place. A copy of the final report prepared by the student will be presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from area coordinators.

TRN 1592 Independent Study 2 QH
Same as TRN 1591.

TRN 1593 Independent Study 3 QH
Same as TRN 1591.

TRN 1594, TRN 1595, TRN 1596, TRN 1597 Independent Study 4 QH each
Same as TRN 1591.

TRN 1721 Labor/Management Issues in Transportation 4 QH
Focuses on labor in the transportation industries. Examines trends in employee compensation, productivity, bargaining patterns, and influence of government policies on labor/management issues.

TRN 1760 International Transportation and Logistics Management 4 QH
Analyzes the managerial activities of logistics planning and operations in multinational firms. Focuses on contemporary issues that affect the design of international logistics systems, and examines the current and future status of ocean and air transportation in international trade and development.

TRN 1891 Honors Thesis in Progress 0 QH

TRN 1892 Honors Thesis 8 QH

TRN 1893 Honors Thesis in Progress 0 QH

TRN 1894 Honors Thesis 12 QH

Computer Science

COM 1100 Fundamentals of Computer Science

4 QH

Introduces computers and computer programming. Studies basic concepts of a high-level language such as data types, variables, assignment, expressions, statements, and input/output. Surveys structured programming tools including flow control constructs, procedures and functions, parameters, local variables, and user-defined data structures. Discusses the string and array data structures in detail. Introduces graphics and animation. Emphasizes the systematic design of programs using structured components.

COM 1101 Algorithms and Data Structures I

4 QH

Introduces algorithms, data structures, abstraction, and modularization. Discusses elementary sorting and searching. Studies data structures such as records and combinations of arrays and records, external text and binary files, linked lists, stacks and queues. Introduces recursion as a technique for the rapid design of complex algorithms. *Prereq.* COM 1100, COM 1108 or equivalent.

COM 1102 Functional Programming and Its Applications

4 QH

Introduces the fundamental concepts and applications of functional programming and their relationship to computer science. Reviews basic ideas underlying symbolic information processing and the role of LISP in this context. Covers applications selected from artificial intelligence, programming language design and implementation, procedural and data abstraction, and development of data-driven programs. *Prereq.* COM 1101.

COM 1105 Computer Science and Its Applications

4 QH

Provides an opportunity for students of all majors to understand and experience the computer science field and to become informed and intelligent users of its tools. Explores using the computer as a fundamental component of the problem-solving process. Discusses the basic principles. Provides hands-on experiences with word processors, spreadsheets, and database management systems. *Not open to computer science or business administration majors.*

COM 1110 FORTRAN Laboratory

1 QH

Considers elements of FORTRAN programming for those familiar with a high-level language such as Pascal or C. Includes input/output, subroutine linkage, and methods of structured programming in FORTRAN. *Prereq.* COM 1100.

COM 1114 C Laboratory

1 QH

Examines elements of C programming for those familiar with a high-level language such as Pascal and with elementary data structures. Emphasizes how C combines tools for structured programming with mechanisms for producing efficient code. *Prereq.* COM 1101.

COM 1115 Introduction to Computers I

1 QH

Introduces students to personal computers and how they can enhance productivity. Discusses the basic operations and style of interaction on PCs. Teaches word processing. Introduces drawing and painting programs for creating presentation graphics. *Students may take either COM 1105 or the sequence COM 1115, COM 1116, and COM 1117, but not both. Not open to computer science or business administration majors.*

COM 1116 Introduction to Computers 2

1 QH

Discusses using spreadsheets for data analysis. Describes how to create charts and graphs for data presentation. Introduces simple data management tasks. *Prereq.* COM 1115 or equivalent. *Students may take either COM 1105 or the sequence COM 1115, COM 1116, and COM 1117, but not both. Not open to computer science or business administration majors.*

COM 1117 Introduction to Computers 3

1 QH

Discusses the design and use of relational databases for sophisticated data management tasks. Utilizes packages for statistical and graphic analysis of data. *Prereq.* COM 1115 and COM 1116 or equivalent. *Students may take either COM 1105 or the sequence COM 1115, COM 1116, and COM 1117, but not both. Not open to computer science or business administration majors.*

COM 1121 Computer Science Overview 1

1 QH

Introduces students to Northeastern and the Computer Science program. Discusses general issues relevant to college survival such as goals, values, standards, and time management. Describes the various subfields in computer science in relation to curriculum planning and undergraduate degree requirements. Rapidly introduces several application packages such as word processing, spreadsheets, and drawing programs. Emphasizes the use of spreadsheets as a general problem-solving tool. *Prereq.* Computer science majors only.

COM 1122 Computer Science Overview 2

1 QH

Introduces the UNIX operating system. Helps students develop fluency in UNIX through hands-on use of such UNIX utilities as emacs, mail, mosaic, newsgroups, grep, tex/latex, shell commands, and other topics. *Prereq.* Computer science majors only.

COM 1130 Computer Organization and Design

4 QH

Discusses how a computer system works and why it performs as it does. Topics include assembly language: programs, call/return, stack frames; arithmetic: representations and algorithms; digital design: an implementation of an RISC subset; and organization: the memory hierarchy. *Prereq.* COM 1101.

COM 1201 Algorithms and Data Structures 2

4 QH

Introduces complex data structures and the corresponding algorithms for manipulation. Examines trees; binary search; priority queues, heaps, and heapsort; and quicksort. Introduces analysis of algorithms. Surveys graphs; depth-first and breadth-first search; shortest path and minimal spanning tree; sets, union, and find; hashing; and balanced trees. *Prereq.* COM 1101 and MTH 1137.

COM 1204 Object-Oriented Design

4 QH

Introduces the philosophy and methodology of object-oriented design utilizing a modern, full-featured, object-oriented programming language. Considers the concepts of encapsulation class, template instance, data members, and function members, constructors, destructors, and overloading of functions and operators. Introduces class libraries as the foundation for systematic software design. Applies object-oriented design to small and medium scale projects and compares object-oriented methods to other paradigms of software design. *Prereq.* COM 1101 and COM 1114, or permission of the instructor.

- COM 1205 Software Design and Development** 4 QH
Presents the latest ideas and techniques in software methodology and provides a means for students to apply these techniques. Students, working in groups, will be expected to design, implement, test, and document a large software project. *Prereq.* COM 1201, COM 1204.
- COM 1230 Introduction to UNIX Tools** 4 QH
Introduces the essentials of UNIX programming via the use of high-level programming languages and tool kits. Topics include the UNIX shell and essential utilities, perl, tcl/tk, python, and high-level TCP/IP networking basics. Provides students with an opportunity to learn the tools and programming languages available that will help them make the best use of UNIX and UNIX development.
- COM 1315 Database Design** 4 QH
Focuses on designing a database for use in a relational database management system. Uses the entity-relationship model and normalization on example problems. Presents the SQL language. Topics may include the network model, the hierarchical model, or the object-oriented model. Nonmajors with programming experience in PASCAL or C are welcome. Requires implementing a database schema and short application program on a commercial database management system. *Prereq.* COM 1101 or programming experience in a high-level language.
- COM 1317 Transaction Processing Systems** 4 QH
Focuses on the concepts and practice of modern transaction processing systems in a distributed setting. Describes the overall architecture of systems such as TP monitor, recovery manager, log manager, and lock manager. Discusses the principles of DO/UNDO/REDO logging such as the write-ahead log rule and the force log-on-commit rule. Describes compensation log records, checkpoint and restart recovery procedures, two-phase commit, lock tables, granularity of locking, and two-phase locking. *Prereq.* COM 1310 and COM 1315.
- COM 1330 Operating Systems** 4 QH
Studies the process model of computing; interprocess communication: the client-server model; input and output: hardware and device drivers; and file systems: safety and security. *Prereq.* COM 1201, COM 1130.
- COM 1335 Distributed Operating Systems** 4 QH
Covers distributed operating systems; communication: ATM, client-server, remote procedure call, processors, processes, and threads; distributed file systems; security; and uses case studies. Includes programming on workstations in labs. *Prereq.* COM 1330.
- COM 1337 Computer Communication Networks** 4 QH
Explores data networking. Focuses on concepts, technology, and implementation issues. Discusses distributed system requirements, network architectures, OSI model, communication protocols, routing algorithms, local area networks, public data networks, vendor network architecture, PC networks, standards, internetworking, network management, and performance issues. Uses examples from real networks (such as IBM, SNA, DEC's DECnet, Ethernet, Token Ring, and X.25) to reinforce theory. Requires using real networks and designing and implementing communication protocols. *Prereq.* COM 1330.
- COM 1350 Automata and Formal Languages** 4 QH
Covers finite-state machines and regular expressions; context-free grammars; properties and decidability problems of regular and context-free languages; pushdown automata; pumping theorems for regular and context-free languages; Turing machines, Church's thesis, and the halting problem; and applications to compilers, artificial intelligence, and pattern recognition. *Prereq.* COM 1201 and MTH 1137.
- COM 1355 Compiler Design I** 4 QH
Implements lexical analyzers and parsers as specified by regular expressions and context-free grammars. Emphasizes the use of LALR(1) or LL(1) parser generators. Covers basic code generation. Uses a hands-on approach, including either a sequence of programming assignments or a project. *Prereq.* ECE 1178 and COM 1350.
- COM 1358 Analysis of Programming Languages** 4 QH
Covers run-time behavior of programming languages; interpreters; static and dynamic scoping; parameter-passing mechanism; implementation of functions and recursion; and features of current languages and their implementation. *Prereq.* COM 1102.
- COM 1370 Computer Graphics** 4 QH
Focuses on characteristics and programming of graphics output devices. Presents basics point and line drawing, two-dimensional displays, and clipping and windowing. Surveys pictures: data structures and display file organization; and interaction: graphical input and external events-operating system considerations. Includes some three-dimensional drawing. *Prereq.* COM 1201 and MTH 1301.
- COM 1390 Algorithms** 4 QH
Introduces the basic principles and techniques of analyzing algorithms. Topics include algorithms on sorting, searching, graphs, and digraphs (such as minimal spanning tree, shortest path, depth-first search, components of a graph); and methods involving string matching, polynomials and matrices. Considers fast Fourier transform and the concept of NP-complete problems. *Prereq.* COM 1201, MTH 1125, MTH 1137, and MTH 1301.
- COM 1400 Data Parallel Computing** 4 QH
Introduces the basic concepts of parallel computer architectures, network topologies, and data parallel programming. Emphasizes SIMD machines with mesh or hypercube interconnection networks of workstations. Studies fundamental data structures and data parallel algorithms for matrix operations, fast fourier transforms, and graph and geometric computations for complexity and performance characteristics. Requires a significant amount of programming to complete course assignments.
- COM 1410 Artificial Intelligence** 4 QH
Focuses on the required capabilities for a computer to be intelligent by studying current methods for automated understanding, problem solving, and learning. Students perform experiments with semantic nets, logical deduction systems, evidential reasoning systems, and neural nets. *Prereq.* COM 1102, COM 1201.
- COM 1420 Principles and Methods in Interactive Systems Design** 4 QH
Introduces principles of computer-human interface (software) design, and methodologies of implementation, evaluation, and research in computer-human interaction. Topics include user psychology, dialog styles (menu interfaces, command languages, icons, windows), screen layout and design, input and output

devices (mouse, touchscreen, keyboard, voice technology), error handling/reporting and system response time, user documentation, and "intelligent" interfaces. Traces techniques for implementing software-human interfaces, and methodologies for testing and assessing the "usability" of interactive systems.

COM 1600 Computer Science Project 4 QH

Presents the latest ideas and techniques in software methodology and provides a means for students to apply these techniques.

Students, working in groups, will be expected to design, implement, test, and document a large software project. *Prereq.*

COM 1102, COM 1110, COM 1201, and COM 1355.

COM 1621 Computer Science Seminar 1 QH

Prepares students in methods of oral presentation of a topic in computer science. Describes techniques in preparation of overheads and other visual aids and their appropriate and effective use. Requires students to give a 20–30 minute oral presentation with overheads on a topic of their choice. *Prereq. Computer science seniors only.*

COM 1721, COM 1722, COM 1723 1 QH each

Freshman Honors Seminar 1, 2, and 3

Offers a seminar course for freshman honors students in computer science and for freshman honors students in other majors who are concurrently taking COM 1100, COM 1101, or COM 1201 respectively, or who have completed these courses. Introduces a variety of topics that extend the material in the standard freshman computer science courses or go beyond the scope of these courses. *Prereq. Enrollment in the honors program or permission of the instructor.*

COM 1770 Computer Science Seminar (Honors) 4 QH

Offers a capstone course for computer science honors students.

Exposes students to a variety of computer science topics of current interest, and provides an opportunity to improve skills in presenting technical material. Requires students to prepare a one hour presentation of professional quality on a topic of interest in computer science. Requires the student to write paper on the same topic.

COM 1777 Honors Adjunct Computer Science 1 QH

Allows honors students who do not have an honors section to do honors work in one of the computer science elective courses while enrolled in the regular course.

COM 1800 Directed Study in Computer Science 4 QH

Provides students strong in computer science and related sciences a chance to develop the art and skill needed to work independently and creatively in computer science. Programs of directed study, held one or more quarters, are available for highly motivated students who wish to explore in depth special topics in computer science. Directed study can be used as an opportunity to examine familiar material in fresh ways or to explore new material that is not offered in formal courses. *Prereq. Permission of the instructor; may be repeated for credit.*

COM 1810 Topics in Computer Science 4 QH

Focuses on an advanced topic in computer science to be selected by the instructor. *Prereq. Permission of the instructor.*

Cooperative Education

COP 1135 Professional Development for Journalists

1 QH

Provides current career information in the field of journalism primarily through outside speakers. Prepares journalism students for field experience. Employs current preferred learning and working style models for self exploration.

COP 1180 Career Decision-Making

4 QH

Focuses on needs and concerns of students who may be undecided or uncertain about their academic major or career direction. Emphasizes self-assessment, career exploration, decision making, and goal setting. *Prereq.* Freshmen or sophomores in any major or permission of instructor.

COP 1220 Working in the United States

4 QH

Helps international students in their freshman through middler years compete more effectively for cooperative education positions in the United States and assists them in their cultural transition into the American work force. Considers work-oriented cross-cultural issues, the American work ethic, skills development, resume writing, and interviewing techniques. *Prereq.* International students in first or second year in the United States, or permission of instructors.

COP 1314 Life/Coreer Plonning

4 QH

Focuses on career exploration, self-assessment, job-search techniques, and networking. Requires students to prepare a professional resume, to participate in videotaped mock interviews, to research careers, and to investigate graduate and professional schools. *Prereq.* Junior or senior standing or permission of instructor.

COP 1353 Professional Development for Education

1 QH

Examines career development and career management issues of teaching professionals. Discusses important components of the after-graduation job search process, and utilizes advice from professionals in the field. Examines a number of current issues relating to the working conditions of teachers, such as the role of the teachers' union, teacher certification and graduate school, career issues for women, and alternative careers in education.

COP 1390 Community Service Learning

4 QH

Provides an introduction to service learning methodology as a way of teaching and learning for lifelong exploration of questions of civic responsibility, multicultural perspectives, societal norms, individual/group empowerment, and values clarification. Students will have the opportunity to explore the relationship of community service to academic study and career decision making.

Criminal Justice

CJ 1101 Administration of Criminal Justice

4 QH

Surveys the contemporary criminal justice system from the initial contact with the offender through prosecution, disposition, incarceration, and release to the community. Emphasizes major systems of social control: police, corrections, juvenile justice, mental health systems, and their policies and practices relative to the offender. Maintains balanced study by providing legal, empirical, and sociological materials.

CJ 1112 Critical Issues in Criminal Justice

4 QH

Introduces students to the major issues and ethical considerations facing criminal justice and criminology today. Discusses six to eight major critical, moral, and ethical issues. Considers such core topics as the death penalty, abortion, euthanasia, abolition of the insanity plea, victimless crimes (prostitution, drug abuse, gambling), and gun control. Presents these issues in the format of pros and cons; involves student presentations or debates.

CJ 1151 Introduction to Law and the Legal Process 1

4 QH

Provides an introduction to the law and the legal system of the United States. Sets forth the fundamentals of our legal process and provides a summary description of both the private and public law system. Presents an overview of the traditional structure, as well as the basic principles of law.

CJ 1152 Introduction to Law and the Legal Process 2

4 QH

Continues the material presented in CJ 1151. Introduces basic tort and contract principles, administrative law, and governmental regulation of business, topics of particular concern to criminal justice professionals in both the public and private sectors, as well as to those students concentrating in legal studies. *Prereq.* CJ 1151 and CJ 1252.

CJ 1201 Criminology

4 QH

Introduces the major theories of crime causation developed over the past two centuries. Explores the scope and nature of the current crime problem in the United States. Examines the characteristics of specific criminal behavior such as violent crime, property crime, organized crime, white-collar crime, and public order crime.

CJ 1251 Introduction to Criminal Law

4 QH

Deals with the area of criminal responsibility, some of its limitations, and certain modifications substantially affecting it. Requires an ability to express in writing both the knowledge of a particular concept and the ability to identify it in a complex fact pattern and discuss its implications and ramifications.

CJ 1252 Criminal Due Process

4 QH

Focuses on a historical evaluation of the Fourteenth Amendment and its use in making rights prescribed under the Bill of Rights applicable to the individual states. Also details the inherent problems of the Fifth and Sixth Amendments, including the effect of their implications on such matters as police practices, illegal search and seizure, and right to counsel. Expects students to be familiar with basic concepts as well as changing interpretations so they can cite cases that may stand as precedents for conclusions they draw. *Prereq.* CJ 1251.

CJ 1253 Introduction to Criminal Courts

4 QH

Examines the role of criminal courts in the United States, the structure and organization of the court system, and the flow of

cases from arrest to conviction. Focuses on the key actors in the courtroom—prosecutors, defense attorneys, judges, and court clerks—and the decision-making processes in charging, setting bail, pleading guilty, going to trial, and sentencing. Addresses prospects for reforming courts. *Prereq.* CJ 1251 and CJ 1252.

CJ 1254 Civil Liability in Criminal Justice

4 QH

Studies the contemporary problems of civil liability affecting the criminal justice professional. Reviews cases involving police, security, probation, parole, and corrections personnel to help students understand and appreciate the legal factors, public policy issues, and methods of reducing the risk of civil liability. *Prereq.* CJ 1251 and CJ 1252.

CJ 1255 Introduction to Juvenile Law

4 QH

Introduces the way society responds to juvenile offenders. Topics studied may include important legislation, fundamental case law, behavioral research studies, philosophy, history, delinquency, abuse and neglect, transfers and waivers, status offenses, and comparative law. Students may be required to observe actual juvenile cases in the Massachusetts Juvenile Court. *Prereq.* HCJ 1252 and junior or senior only.

CJ 1301 Introduction to Security

4 QH

Examines the organization and administration of security and loss prevention programs in industry, business, and government. Emphasizes the protection of assets, personnel, and facilities and focuses on the relations between security organizations and government agencies.

CJ 1302 Theories of Investigation

4 QH

Examines the commonalities and differences between criminal and non-criminal investigations, using various sources of information, and legal constraints imposed on investigators. Studies how forensics helps investigators in criminal investigations. Discusses interviewing techniques, report writing, and giving testimony.

CJ 1311 White-Collar Crime

4 QH

Gives the student a basic understanding of white-collar crime. Covers such topics as the nature and extent of white-collar crime, the social-psychologic makeup of white-collar crime, typologies, current efforts directed toward controlling it, and the interagency and jurisdictional problems and the benefits of cooperation.

CJ 1314 Security Management and Supervision

4 QH

Deals with the roles and responsibilities of the security manager. Gives special attention to the responsibilities of planning, organizing, staffing, directing, controlling, representing, and innovating. Explores the manager's responsibility in professionalizing security and other relevant issues. *Prereq.* CJ 1301 or equivalent.

CJ 1318 Terrorism

4 QH

Attempts to give the student an understanding of what terrorism is and why it has become so popular. Includes the role of news media, political consequences of terrorism, the military as a resource, and the role of the hostage.

CJ 1319 Legal Aspects of Security Management and Operations

4 QH

Provides a comprehensive examination of the legal environment and issues affecting security operations and management. Analyzes elements of criminal, civil, property, regulatory, and

business law from the perspective of organizational security management concerns. Includes legal basis of security practices, civil liability, corporate security, investigations, labor law, industrial espionage, governmental security issues, and other relevant topics.

CJ 1401 Policing a Democratic Society 4 QH

Gives an understanding of the role and function of policing in a modern democratic society. Examines contemporary American policing in light of its Anglo-Saxon roots, and compares it to policing in other Anglo-Saxon countries (such as Canada and Australia), and other modern police systems. Examines police in light of contemporary major issues including race, index crime, drugs, disorder, conflict, and riot. Examines the contemporary shift from reform (professional) to community and problem-oriented policing.

CJ 1411 Police Strategy 4 QH

Examines the current organizational strategy of American police, their goals and mission, and the resources and tactics they adopt to pursue those goals. Emphasizes the authority and resources granted to police; police function, organization, and administration; the demand for police services; the relationship of police to their environment; police tactics; and the outcome for which police strive. Focuses on police accountability and effectiveness. *Prereq.* CJ 1401.

CJ 1424 Seminar in Policing 4 QH

Specific topic in policing to be announced. *Prereq.* CJ 1401, CJ 1411, and junior standing or above.

CJ 1426 Topics in Policing 4 QH

Specific topic in policing to be announced. *Prereq.* Junior standing or above.

CJ 1427 Topics in Criminal Justice 4 QH

Specific topic in criminal justice to be announced. *Prereq.* Junior or senior standing.

CJ 1453 Criminal Justice Research Methods 4 QH

Examines basic concepts in conducting criminal justice research. Students will become familiar with research techniques that are necessary for systematic analysis of the criminal justice system, offenders' behavior, crime trends, program effectiveness, problem analysis, etc. Requires that students actively pursue such techniques as research interviewing, data coding, and preliminary analysis in and outside of class. *Prereq.* MTH 1010 or equivalent.

CJ 1454 Criminal Justice Statistics 4 QH

Focuses on the use of statistics with special emphasis on criminal justice applications and the analysis of criminal justice data. Covers basic descriptive statistics, including levels of measurement, measures of central tendency, and measures of variability. Introduces the student to inferential statistics, including the normal curve, sampling error and confidence intervals, hypothesis testing, chi-square, and correlation. *Prereq.* HCJ 1453.

CJ 1501 Evidence 1 4 QH

Provides students the opportunity to develop their understanding of the manner in which legal issues and disputes are resolved by trial. Focuses on the manner in which the trial system works and the reasoning behind the rules governing its operation, including rules of evidence: the mechanics of the adversary system, relevancy, reliability, and rules of exclusion based on policy considerations other than relevancy and reliability. Includes such learning tools as video-

tapes, mock trials, observation of actual court trials, lectures, take-home assignments, and exams. *Prereq.* CJ 1251 and CJ 1252.

CJ 1502 Evidence 2 4 QH

Continues with reliability and rules of exclusion, based on policy considerations other than relevancy and reliability, as set forth in CJ 1501. *Prereq.* CJ 1501.

CJ 1512 Seminar in Law and Criminal Justice 4 QH

Specific topic in the law and criminal justice to be announced. *Prereq.* CJ 1251, CJ 1252, and junior or senior standing.

CJ 1513 Criminal Homicide 4 QH

Surveys the topic of homicide. Explores general murder patterns and analyzes types of homicide emphasizing mass and serial killing. Discusses criminal justice issues in apprehension, prosecution, and punishment of murder.

CJ 1601 Survey of Correctional Systems 4 QH

Offers an introduction to penology and corrections. Explores the public reaction to convicted offenders historically, while concentrating on issues and programs of contemporary corrections. *Prereq.* CJ 1201.

CJ 1612 Juvenile Justice 4 QH

Gives an overview of the institutional response to the problems of juvenile delinquency, juvenile misconduct, and dependent/neglected and abused children. Emphasizes the police, court, and correctional agencies that process young people. In addition, devotes attention to an understanding of the history of the system, recent legal developments, and an assessment of current proposals for reform. *Prereq.* SOC 1100 and CJ 1201.

CJ 1613 Probation and Parole 4 QH

Examines the nature and problems of correctional field service, both adult and juvenile. *Prereq.* CJ 1601.

CJ 1615 Crime and Criminal Justice: A Comparative View 4 QH

Examines the problems of crime and its control from the vantage point of the comparative perspective. Analyzes countries such as Soviet Russia, China, France, East Germany, and West Germany. Also analyzes Great Britain, Holland, Finland, and Sweden in terms of their incidence and type of deviance and crime, as well as in terms of approach to social control and prevention of crime. Examines points of divergence between these countries and the United States in perceived causes of crime and differing approaches to rehabilitation and crime prevention. *Prereq.* CJ 1101, SOC 1100, or equivalent.

CJ 1616 Women and the Criminal Justice System 4 QH

Introduces students to issues relating to roles taken by women involved with the criminal justice system and to the system's various responses to women in these roles. Focuses on women as victims of crime, as offenders, and as practitioners. *Prereq.* Middler standing or above.

CJ 1618 Victims of Crime 4 QH

Examines current theory and research regarding victims of crime. Devotes attention to concepts such as victim vulnerability and victim culpability. In addition, discusses the implications of a victim-oriented perspective for the administration of justice. Assesses current victim programs, including restitution, mediation, and compensation.

CJ 1621 Incarceration

4 QH

Offers in-depth familiarity with key reading in the history and sociology of incarceration. Topics include theories of incarceration; sentence determination; history of our incarceration systems; inmate and staff perspectives on incarceration; and special category inmates (mentally ill, rape victims, death row prisoners). Includes extensive discussion. *Prereq. CJ 1301, middler standing or above, and QPA over B-; or permission of instructor.*

CJ 1801, CJ 1802, CJ 1803, CJ 1804 Directed Study

4 QH each

Engineering

Chemical Engineering

The course descriptions listed under chemical engineering are intended to show the general scope of the subject that will be covered. Since courses are continually updated, specific topics or methods of approach may vary from term to term. In addition to meeting course prerequisites, students are expected to take each chemical engineering course in the sequence shown on the specimen program sheet.

CHE 1201 Chemical Engineering Calculations 1 4 QH
Examines the application of fundamental laws of mass and energy conservation to chemical and physical processes. Emphasizes material balances. A corequisite computational lab aids students in improving facility in handling problems typical of the course. Lab fee. *Prereq.* CHM 1132 and CHM 1138; CHE 1205 taken concurrently.

CHE 1202 Chemical Engineering Calculations 2 4 QH
Continues CHE 1201. Emphasizes energy balances and the simultaneous application of mass and energy conservation laws. Considers typical chemical processing industry problems. *Prereq.* CHE 1201.

CHE 1205 Computation Laboratory 2 QH
Offers lab sessions to aid students in problem formulation and solution. The assignments are based on material presented in CHE 1201. Emphasis is placed on computer software applications. Lab fee. *Prereq.* CHE 1201 taken concurrently.

CHE 1211 Chemical Engineering Thermodynamics 1 4 QH
Covers the first law and its application to batch and flow systems, heat effects in chemicals, and physical properties of real fluids. Applies basic principles and mathematical relations to the analysis and solution of engineering problems. *Prereq.* CHE 1201 and CHE 1205.

CHE 1310 Chemical Engineering Thermodynamics 2 4 QH
Covers thermodynamic properties of mixtures; fugacity and the fugacity coefficients from equations of state for gaseous mixtures; liquid phase fugacities and activity coefficients for liquid mixtures; phase equilibria; the equilibrium constant for homogeneous gas-phase reactions; and extension of theory to handle simultaneous, heterogeneous, and solution reactions. *Prereq.* CHE 1300.

CHE 1321 Momentum Transport 5 QH
Covers topics such as physical properties of fluids, pipe flow for process application, fluid metering, macroscopic balances and their application, microscopic balances, and boundary layer and turbulent flow theory. *Prereq.* CHE 1211 and CHE 1300.

CHE 1415 Experimental Methods 1 5 QH
Presents a comprehensive approach to solving experimental chemical engineering problems. Requires students to design, conduct, and report on experimental work orally and in writing. Involves experiments in unit operations in process measurements, fluid metering, and heat exchangers. Includes lectures on the principles of laboratory safety and data handling techniques. Lab fee. *Prereq.* CHE 1321.

CHE 1416 Experimental Methods 2 5 QH
Continues CHE 1415, requiring more advanced experimentation and more extensive reports. Involves experiments in unit operations in distillation, evaporation, extraction, filtration, or separations. Requires oral and written communications. Lab fee. *Prereq.* CHE 1415.

CHE 1421 Chemical Engineering Kinetics 4 QH
Covers fundamental theories of the rate of chemical change in homogeneous reacting systems; integral and differential analysis of kinetic data; design of batch and continuous-flow chemical reactors; and an introduction to heterogeneous reactions and reactor design. *Prereq.* CHE 1310.

CHE 1431 Heat Transport 5 QH
Presents the fundamentals of heat transport. Covers the design of heat transfer equipment and estimation of heat transfer rates. Includes conduction, convection, condensation, and boiling, and covers heat exchangers, evaporators, and driers. *Prereq.* CHE 1321.

CHE 1441 Separation Processes 5 QH
Describes the principles utilized in the physical separation of chemical mixtures. Covers filtration, evaporation, extraction, and distillation. Introduces equilibrium stages as applied to the separation of binary mixtures by liquid-liquid extraction and by continuous distillation. *Prereq.* CHE 1431.

CHE 1450 Chemical Engineering Economics 4 QH
Introduces financial decision-making techniques as applied to problems of production, storage, transportation, and utilization of chemical resources to meet societal needs. *Prereq.* ECN 1115.

CHE 1501 Chemical Process Design 1 6 QH
Focuses on the design of a chemical process. Topics include computer simulation of steady-state processing conditions, selecting process operations, preparing flowsheets and stream tables, and evaluating the economics of a chemical process design. Explores a comprehensive chemical process design problem with a team approach. *Prereq.* CHE 1421 and CHE 1441.

CHE 1502 Chemical Process Design 2 6 QH
Continues CHE 1501. Requires each student to solve a comprehensive chemical process design problem. Includes topics such as heat and power integration in chemical processing, design and scheduling of batch processes, sequencing separation operations, and safety considerations in process design. *Prereq.* CHE 1501.

CHE 1503 Projects 1 6 QH
Offers individual research related to some phase of chemical engineering. Open only to students selected by the department head on the basis of scholarship and proven ability. Lab fee. *Prereq.* Senior standing and permission of department.

CHE 1504 Projects 2 6 QH
Continues the research work begun in CHE 1503. Lab fee. *Prereq.* CHE 1503.

CHE 1511 Mathematical Methods in Chemical Engineering 4 QH
Examines the formulation and solution of problems taken from chemical and engineering studies that require advanced

mathematical methods. Emphasizes the formulation step, and discusses numeric and analytic solution techniques for solving sets of algebraic equations and for solving ordinary and partial differential equations. *Prereq. Senior standing; Chemical Engineering elective.*

CHE 1512 Chemical Process Control 4 QH
Covers the Laplace transform and its use in solving ordinary differential equations; modeling and computer simulation of basic heat, mass, and fluid-flow dynamics; linearization of nonlinear systems; the transfer function; sensors, transmitters, valves, and controllers; block-diagram algebra; dynamics of higher-order systems; modeling and simulation of control-loop dynamics; frequency response; and Laplace and frequency domain stability analysis. *Prereq. Senior standing.*

CHE 1514 Special Topics 4 QH
Presents chemical engineering topics of interest to the staff member conducting the class. *Prereq. Senior standing.*

CHE 1516 Mass Transfer Operations 4 QH
Focuses on the mass transfer operations of crystallization, adsorption, chromatography, ion exchange, and membrane separations. *Prereq. Senior standing; Chemical Engineering elective.*

CHE 1519 Polymer Science 4 QH
Introduces polymers and polymer chemistry, synthesis and reactions of polymers, and thermodynamics and kinetics of polymerization. Includes topics such as physical characterization of polymers; molecular structure, properties, and applications of polymers; and polymer processing and testing of polymers. *Prereq. CHE 1421 and CHM 1272; Advanced Chemistry elective.*

CHE 1520 Pollution Control in Chemical Industries 4 QH
Studies fundamental operations for handling environmental problems in the chemical process industries. Discusses water quality requirements and industrial waste characteristics. *Prereq. Senior standing; Chemical Engineering elective.*

CHE 1524 Chemical Process Safety 4 QH
Introduces students to important technical fundamentals as applied to chemical process safety. Demonstrates good chemical process safety practice through chemical plant trips, visiting experts, and video presentations. *Prereq. Senior standing; Chemical Engineering elective.*

CHE 1530 Biochemical Engineering Fundamentals 4 QH
Presents key concepts in biochemistry, cell biology, enzyme kinetics, and metabolic pathways, offered as an introductory exposure to these topics and not as complete coverage of life science fundamentals. Topics include biological reactor kinetics and design, transport phenomena in bioprocess systems, and process instrumentation/control. *Prereq. Senior standing; Chemical Engineering elective.*

CHE 1777 Honors Adjunct 1 QH
To be added to any 4 QH course in the department when approved by the Honors Committee of The College of Engineering. Once approved, the adjunct information is forwarded to the Honors Office for dissemination to the honors membership. Students may enroll in CHE 1777 an unlimited number of times as it can be adjunct to any chemical engineering course. *Prereq. Permission of department.*

CHE 1796 Honors Project 1 4 QH
Provides an opportunity for students to formulate and execute an analytical or experimental project under the guidance of a faculty member. Open only to students in the honors program. *Prereq. Permission of department.*

CHE 1797 Honors Project 2 4 QH
Continues CHE 1796. *Prereq. CHE 1796.*

Civil Engineering

CIV 1210 Structural Mechanics 1 4 QH
Covers statics of particles and rigid bodies in two and three dimensions; analysis of internal forces in trusses and beams; centroids and centers of gravity of lines, area, and volumes; and moments of inertia of areas and masses. *Prereq. MTH 1223 taken concurrently and PHY 1222.*

CIV 1211 Structural Mechanics 2 4 QH
Surveys analysis of stress and strain; mechanical properties of materials; elastic analysis of stresses and deformations of members subject to axial load, torsion, shear, and moment. Introduces column behavior. *Prereq. CIV 1210.*

CIV 1220 Structural Analysis 1 4 QH
Reviews reactions, shear and bending moment diagrams, bar forces in trusses, deflections by virtual work, and moment area methods. Analyzes indeterminate structures by consistent deformations, slope deflection, and moment distribution. *Prereq. CIV 1211.*

CIV 1222 Structural Analysis 2 4 QH
Focuses on matrix analysis of indeterminate structures using both flexibility and stiffness approaches. Examines computer applications to analysis of framed structures. *Prereq. CIV 1220.*

CIV 1226 Structural Analysis and Design Laboratory 2 QH
Uses lectures, experimental studies, computation labs, and computer projects to develop students' knowledge of structural behavior and understanding of the design and analysis of structures. *Prereq. CIV 1220 taken concurrently.*

CIV 1240 Concrete Design 1 4 QH
Reviews mechanical properties of steel and concrete. Studies behavior and design of reinforced concrete beams for shear, moment, and bond; and design of stocky columns for axial load and moment. Emphasizes strength design. *Prereq. CIV 1220.*

CIV 1241 Concrete Design 2 4 QH
Covers various topics including design of slender columns, foundations, and multistory buildings with one-way and two-way floor systems. *Prereq. CIV 1240.*

CIV 1245 Advanced Structural Design 4 QH
Continues concrete and steel design. Topics in concrete design include columns with axial loads and bending moments, biaxial bending, and slenderness effects; footings to support walls and columns; prestressed concrete fundamentals. Topics in steel design include bolted and welded connections with tension, shear, combined tension and shear, and eccentric shear; framed beam connections; beam-to-column moment connections; composite columns with combined bending and axial load; composite

beams with full and partial composite action. *Prereq.* CIV 1240 and CIV 1250.

CIV 1250 Steel Design 1 4 QH

Focuses on design of steel members subject to tension, compression, bending, and combinations of loading; and design of connections, braced frames, and rigid frames. *Prereq.* CIV 1220.

CIV 1251 Steel Design 2 4 QH

Discusses topics including design of steel plate girders, composite construction in bridges and buildings, plastic analysis and design, and the design of high-rise buildings subject to lateral loads. *Prereq.* CIV 1250.

CIV 1295 Structural Design Projects 4 QH

Capstone structural design course. Consists of a minimum of two projects that consider environmental, social, and economic impact. Discusses the safety requirements of various government agencies. Projects require identification of design loading, assessment of structural stability, material usage, and the reliability of the proposed design. Employs computer-aided designs and verifies the results by approximate methods. Considers and analyzes economics of alternative designs. *Prereq.* CIV 1245 taken concurrently, CIV 1222, and senior standing.

CIV 1310 Fluid Mechanics 4 QH

Introduces both the statics and dynamics of fluid mechanics. Topics include properties of fluids; pressure variation in water and air; pressure force on surfaces and submerged bodies, continuity, momentum, and energy principles; dimensional analysis and hydraulic similitude; flow in closed conduits, frictional and local losses in pipes and systems; and problems in steady flow. *Prereq.* CIV 1210.

CIV 1320 Hydraulic Engineering 4 QH

Covers a variety of topics including pipe networks; water hammer; pumps and pump selection; pipe-pump combinations; flow in open channels, uniform flow, gradually varied flow, and hydraulic jump; drag forces on bodies; principles of hydrology, unit hydrograph, and rainfall-runoff relationships; and some aspects of ground water and well hydraulics. *Prereq.* CIV 1310.

CIV 1340 Environmental Engineering 1 4 QH

Focuses on protection and management of the environment. Topics include assessment of environmental quality; introduction to water and wastewater technology; air pollution control; and solid waste management. *Prereq.* CHM 1132.

CIV 1341 Environmental Engineering 2 4 QH

Concentrates on unit operations, unit processes, and related fundamental design of physical, chemical, and biological water and wastewater treatment systems. Typical topics include aeration systems, activated sludge, fixed film biological treatment, gas transfer, reaction kinetics, reactor modeling, sedimentation, filtration, and subsurface disposal system design. *Prereq.* CIV 1310 and CIV 1340.

CIV 1350 Environmental and Hydraulics Design Laboratory 4 QH

Presents lectures and laboratory experiments in the areas of hydraulic and environmental engineering. Laboratory experiments have related design projects which will allow the student to investigate a unit operation or process in some depth. Topic areas covered include several of the following: wastewater neutralization, biological treatment, coagulation, oxygen demand,

oxygen transfer, sedimentation, weirs, pumps, ion exchange, carbon absorption, and disinfection. *Prereq.* CIV 1320 taken concurrently and CIV 1340.

CIV 1370 Air Pollution 4 QH

Focuses on theory and practice related to engineering management of air resources. Surveys microclimate and dispersion of pollutants; atmospheric chemistry; air pollution instrumentation; control of gaseous and particulate emissions; design of air pollution control systems; and biological and chemical aspects of air pollution with emphasis on the toxicological aspects of the environment. Other topics include the physiological effects of aerosols; analysis of organic and inorganic constituents of the atmosphere; and rationale for establishment of air quality criteria and standards. *Prereq.* Senior standing.

CIV 1395 Environmental Design Projects 4 QH

Capstone design course in the field of environmental engineering. Up to six individual design projects are assigned, typically involving water and/or waste treatment, site development, industrial waste handling, chemical treatment, and the modification of existing facilities. Each is given a careful critique. Designs require input relating to environmental protection and impact, economic factors, engineering feasibility, selection from alternatives, and safety consideration. One project requires an oral presentation. *Prereq.* CIV 1320, CIV 1341, CIV 1350, and senior standing.

CIV 1410 Soil Mechanics 4 QH

Studies soil classification, soil-water phase relations, ground water seepage, consolidation theory, strength properties of soils, stress distributions in soils due to surface loads, and slope stability. *Prereq.* CIV 1211 and CIV 1310.

CIV 1411 Soil Mechanics Laboratory 2 QH

Focuses on lab exercises, including soil classification, seepage, shear strength, consolidation, and triaxial testing. *Prereq.* CIV 1410 taken concurrently.

CIV 1420 Foundation Engineering 4 QH

Topics include subsurface explorations, determination of soil-bearing capacity, design of shallow foundations, pile and caisson foundations, design of retaining walls, anchored bulkheads and braced sheeting, and other selected topics on foundation design and construction. *Prereq.* CIV 1410.

CIV 1430 Geotechnology 4 QH

Introduces the geological sciences as they apply to civil engineering practice. Focuses on the effects of significant geological features on location, design, construction, operation, and maintenance of engineering projects. *Prereq.* CIV 1410.

CIV 1495 Geotechnical Design Projects 4 QH

Capstone design course for those interested in the geotechnical area. Two or more projects involving the various aspects of analysis and design used in geotechnical practice. Requires evaluation of subsurface conditions, identification of critical issues, assessment of environmental impacts, economics, safety, construction sequencing, and construction feasibility. They may also include structural design. Examples include design of foundations for super-structures, temporary earth retaining systems for deep excavations, and permanent earth support walls for deep earthen cuts. *Prereq.* CIV 1420, CIV 1430, and senior standing.

CIV 1510 Materials**4 QH**

Focuses on the structural, chemical, and mechanical properties of materials of importance to civil engineers. Topics include fundamental nature of matter; significance of phase transformations; control of microstructure; and the mechanisms of failure of materials. *Prereq.* CHM 1132.

CIV 1511 Materials Laboratory**2 QH**

Uses standard tests and equipment in the lab to determine structural and mechanical properties of materials common to civil engineering practice: concrete, aggregates, steel, wood, asphalt, and others. *Prereq.* CIV 1510 taken concurrently.

CIV 1530 Transportation Analysis and Planning**4 QH**

Studies the analysis and demand prediction for urban passenger transportation and travel demand forecasting by the traditional four-step method and other methods. Discusses impact assessment, including traffic, environmental, and economic impacts. Topics also include the history of urban transportation and analysis of current policy issues. *Prereq.* Junior standing or above.

CIV 1540 Highway Engineering**4 QH**

Presents an overview of highway engineering, including route selection, geometric design, pavement design, drainage, construction, and maintenance. Discusses highway administration, financing, costs, planning and the environmental impact process, and traffic engineering fundamentals for highways. *Prereq.* CIV 1410 and CIV 1620.

CIV 1550 Construction Management**4 QH**

Surveys the construction industry and tasks that must be addressed by construction management, including resource allocation, construction environment, organization, contracts, funding, cash flow, productivity, labor relations, network planning and scheduling, construction accounting, and project control. *Prereq.* Senior standing.

CIV 1595 Transportation Design Projects**4 QH**

Capstone design course in transportation. Involves planning/design of modified transportation facilities and services. Topics include demand estimation, highway design, traffic flow, safety, economic and social considerations, environmental impacts, and transit fleet size requirements. Examples of such projects are planning for a new highway, transportation systems management planning for an existing corridor, and design of an intermodal transfer facility. *Prereq.* CIV 1530, CIV 1540, CIV 1630 taken concurrently, CIV 1640, and senior standing.

CIV 1620 Engineering Measurements**4 QH**

Considers the mathematics and instrumentation used in land surveying for obtaining measurements of distance, elevation, and direction. Covers the methodology applied for traverses, areas, coordinate systems, horizontal and vertical curves, earthwork, and topographic mapping. *Prereq.* MTH 1124 and PHY 1222.

CIV 1621 Engineering Measurements Laboratory**2 QH**

Examines field problems illustrating and applying the lecture material in CIV 1620, with computer applications. *Prereq.* CIV 1620 taken concurrently.

CIV 1630 Civil Engineering Systems**4 QH**

Covers application of system synthesis and optimization techniques: calculus method, linear programming, network analysis, and dynamic programming. *Prereq.* MTH 1223.

CIV 1640 Applied Probability Theory for Civil Engineers**4 QH**

Covers applications of probability theory to civil engineering problems, probabilities of events, random variables and distributions, derived distributions, expectation, common probability models, and an introduction to statistics. *Prereq.* MTH 1223.

CIV 1650 Legal Aspects of Civil Engineering**4 QH**

Introduces business law for engineering organizations, including description and evaluation of various types of contracts for engineering services and construction, procedures for submitting bids, procedures for claims, and legal steps to minimize risk exposure, both in United States and international business. *Prereq.* Senior standing.

CIV 1665 Professional Issues for Civil Engineers**1 QH**

Focuses on concepts and theories of classical and contemporary ethics, moral development theories, and developing and applying professional ethics in engineering. Traces the development and philosophies of professional engineering societies. Covers the requirements and responsibilities of professional registration. *Prereq.* Junior standing.

CIV 1777 Honors Adjunct**1 QH**

To be added to any 4 QH course in the department when approved by the Honors Committee of the College of Engineering. Once approved, the adjunct information is forwarded to the honors office for dissemination to the honors membership. Students may enroll in CIV 1777 an unlimited number of times as it can be adjunct to any civil engineering course.

CIV 1796 Independent Study/Research 1 (Honors)**4 QH**

Involves an analytical or experimental project under the supervision of a department faculty member. Before the end of the first week of the quarter, each student must obtain written approval for a proposed project from the faculty supervisor and from the department. A formal report must be submitted to the faculty supervisor at the end of the quarter. *Prereq.* Junior or senior standing in the honors program.

CIV 1797 Independent Study/Research 2 (Honors)**4 QH**

Continues CIV 1796, or a new project following the guidelines of CIV 1796. *Prereq.* CIV 1796.

CIV 1810 Special Topic in Civil Engineering**4 QH**

This is a special course within the field of civil engineering initiated by the appropriate discipline committee and approved by the department. *Prereq.* Permission of instructor.

CIV 1820 Special Project in Civil Engineering**4 QH**

Offers individual study in an area within the field of civil engineering, selected by the student and his or her instructor with approval by the appropriate discipline committee, resulting in a definitive report and an oral presentation. *Prereq.* Outstanding academic performance.

CIV 1821 Special Project in Civil Engineering**2 QH**

For students wishing to spread an independent project over two quarters. Taking CIV 1821 twice is equivalent to taking CIV 1820. Can be taken over two quarters, with students registering for each quarter.

Electrical Engineering

ECE 1171 Electrical Engineering 1

4 QH

Introduces the basic concepts related to circuits and circuit elements; current, voltage, and power; models for resistors, capacitors, and inductors; and circuit analysis using Kirchhoff's laws. Discusses selected topics that illustrate the variety of applications of electrical engineering, such as AC circuits and electric power, the basics of semiconductor devices with application to transistor amplifier models, transients in circuits with energy storage, digital signals, logic circuits, and some basic concepts of computer operation, specifically number coding, arithmetic operations, and memory circuits. *Prereq.* MTH 1125; *not open to electrical engineering majors.*

ECE 1178 Digital Electronics for Computer Science Majors

4 QH

Introduces electronic digital circuits preparing computer science majors for ECE 1382. Starts with the basics of electronic circuit analysis and continues with the principles of MOS and bipolar semiconductors and their applications to logic gate circuits. Discusses logic circuit design supplemented by hardware considerations: level tolerance, power dissipation, gate, and component count. Introduces circuits with RC time constants to explain delays and speed limitations of logic circuits. Describes basic logic array circuits with application to ROM and PROM. *Not open to electrical engineering majors.*

ECE 1215 Circuits and Systems 1

4 QH

Introduces the basic laws and the basic signal and device models used in the study of linear circuits. Topics include a review of the basic quantities of current, voltage, and power; the basic circuit elements; and Kirchhoff's laws. Covers the concepts of series and parallel connections and equivalent circuits, and the Thevenin and Norton theorems. Introduces three-terminal and dependent source models, with extensive coverage of the ideal operational amplifier model. Discusses various common signal models, including step functions, exponentials, and sinusoids, and first and second order circuits and the classical solution to the related differential equations. *Prereq.* MTH 1125 and PHY 1223. *ECE 1221 must be taken concurrently.*

ECE 1216 Circuits and Systems 2

4 QH

Presents the Laplace transform as a technique for solving the types of differential equations which model linear circuit behavior, followed by Laplace transform equivalent circuit models. Systematic methods for writing circuit equations, including node-voltage and mesh methods, are introduced simultaneously for real and Laplace transform circuit models. Studies the concepts of system function and frequency response, including some study of filter and transfer function design and Bode plots. *Prereq.* ECE 1215 and MTH 1225. *ECE 1222 must be taken concurrently.*

ECE 1217 Circuits and Systems 3

4 QH

Continues the study of basic filter design and Bode plots discussed in ECE 1216. Covers a number of topics related to the sinusoidal steady state at fixed frequency (AC circuits), including phasors, phasor circuits and phasor diagrams; transformers; AC power; and three-phase. Also discusses convolution, two-port networks and Fourier series and Fourier transforms. *Prereq.* ECE 1216 and MTH 1223. *ECE 1223 must be taken concurrently.*

ECE 1221 Measurements Laboratory

1 QH

Covers fundamentals of electrical measurements and instrumentation. Topics include electrical characteristics of meter movement and its use in designing ammeters and voltmeters; sources of DC current and voltage and their characteristics; the oscilloscope and its application to the display of waveforms and I-V curves of two-terminal devices; and the measurement of amplitude, phase, and time interval. *Prereq.* PHY 1223. *ECE 1215 must be taken concurrently.*

ECE 1222 Circuits Laboratory 1

1 QH

Offers experiments in basic circuits and measurements. Topics include AC waveforms and circuits for the measurement of peak, average, and RMS values; network theorems, their experimental verification; null circuits such as the Wheatstone bridge and the potentiometer; and characterization of simple LTI circuits including RL, RC, and RLC circuits, by investigation of their step response and impulse response. *Prereq.* ECE 1221. *ECE 1216 must be taken concurrently.*

ECE 1223 Circuits Laboratory 2

1 QH

Offers laboratory experiments including operational amplifier realizations of controlled sources, resonance in second-order linear circuits, active RC and RLC circuits, and frequency responses of RC circuits. *Prereq.* ECE 1222. *ECE 1217 must be taken concurrently.*

ECE 1224 Electronics Laboratory 1

1 QH

Follows from ECE 1346. Experiments include characteristics and applications of diodes, MOSFET characteristics and CMOS logic applications, design and evaluation of a regulated power supply, and transistor biasing stability. *Prereq.* ECE 1346. *ECE 1347 must be taken concurrently.*

ECE 1225 Electronics Laboratory 2

1 QH

Follows from ECE 1347. Experiments with designing and verifying basic analog circuit functions utilized in integrated circuits. Advantages inherent to ICs, such as component matching and tracking, are exploited in the circuit building blocks investigated. Studies output power stages, current sources, amplifying stages, and differential amplifiers. Topics include applications to signal amplification, D-to-A conversion, and the extraction of weak signals buried in interference. *Prereq.* ECE 1347. *ECE 1349 must be taken concurrently.*

ECE 1226 Discrete Systems Laboratory

1 QH

Utilizes a personal computer to study aspects of A/D and D/A conversion, some aspects of discrete-time Fourier transforms and digital filters. *ECE 1333 must be taken concurrently.*

ECE 1227 Electromagnetic Fields Laboratory 1

1 QH

Supports class material related to microwave transmission and radiation. Experiments include microwave transmission line measurements and the determination of the properties of dielectric materials; transmission line length measurement; reflection and impedance measurement of dipole antenna; frequency characteristics of antennas and waveguides; and antenna mutual coupling and radiation pattern determination. *ECE 1364 must be taken concurrently.*

ECE 1228 Electromagnetic Fields and Energy Conservation Laboratory 2

1 QH

Presents static and quasi-static (low frequency) applications of electromagnetic fields and electromechanical energy conversion. Experiments in electromagnetic fields include measurement of

static electric potentials in electrode structures and field-plotting solution of Laplace's equation and static magnetic field measurements of coil configurations. Experiments in energy conversion include transformers and DC generators. Investigates transformer magnetization, testing, circuit model, and load characteristics; and DC machine magnetization characteristics, and load tests. *ECE 1365 must be taken concurrently.*

ECE 1229 Digital Systems Laboratory**1 QH**

Introduces some aspects of computer hardware design encountered at the digital logic level. Discusses both combinational logic and sequential logic units. Focuses on MSI devices including multiplexers, decoders, counters, shift registers, PROM, RAM, and ALU. Demonstrates the design of Mealy and Moore sequence detectors and other digital subsystems such as parallel binary divider. Covers the use of a field programmable gate array for implementing the design. *ECE 1382 must be taken concurrently.*

ECE 1230 VLSI System Design Laboratory**2 QH**

Examines the design, layout, and simulation of digital VLSI circuits using a comprehensive set of CAD tools. Studies layouts of CMOS combinational and sequential circuits using either a layout editor or automatic layout generators. Studies functional structures including registers, adders, decoders, ROM, PLAs, counters, RAM, and ALU. Utilizes logic and circuit simulators for the logic verification and timing simulation of designed circuits. Designs can be sent to MOSIS for fabrication. *ECE 1351 must be taken concurrently.*

ECE 1231 Electric Power Laboratory 1**1 QH**

Presents a power systems design project encompassing one or more of the following computer studies: transmission line constants, power flow, short circuits, and transient stability. Uses a personal computer to upgrade the design of a small power system. *ECE 1472 must be taken concurrently.*

ECE 1232 Electric Power Laboratory 2**2 QH**

Covers topics in electromechanical energy conversion employing the "Faraday Law machine" bench. Studies Faraday's Law, transformers, reluctance and induction motors, and synchronous machines. *ECE 1365. ECE 1371 must be taken concurrently.*

ECE 1233 Semiconductor Processing Laboratory**2 QH**

Covers fabrication and testing of simple MOS integrated circuits. Students compare process and device models introduced in ECE 1406 with experimental results during weekly lab sessions. Lab work includes oxidation, diffusion, lithography, etching, metallization, and characterization. Fabricated diodes, MOS capacitors and transistors, and simple gates will be electrically characterized. *ECE 1406 must be taken concurrently.*

ECE 1234 Digital Signal Processing Laboratory**2 QH**

Focuses on practical aspects of DSP by programming a digital signal processing chip in its native assembly language. Topics include input/output operations via A/D and D/A converters, digital frequency synthesis, computation of discrete time convolution, speech scrambling through frequency inversion, and design and implementation of both FIR and IIR digital filters. *ECE 1456 must be taken concurrently.*

ECE 1235 Control Systems Laboratory**1 QH**

Familiarizes the student with the practical aspects of control systems design through lab experiments. Topics include analog

computer simulation, digital computer control, and use of CAD packages such as MATLAB for analysis and design of control systems. Experiments with PID control emphasize classical methods of feedback compensation, and an experiment with modern techniques of state variable feedback considers digital speed control of a DC motor. *ECE 1420 must be taken concurrently.*

ECE 1332 Linear Systems 1**4 QH**

Develops the basic theory of continuous linear systems. Discusses nonlinear no-memory systems, develops the time-domain theory of linear time-invariant systems with memory, analyzes convolution, causality, and stability in detail, and develops the bilateral Laplace transform to analyze time-invariant systems in the frequency domain. Discusses gain, phase-shift, and the stability of feedback systems. *Prereq. ECE 1217 and MTH 1225.*

ECE 1333 Linear Systems 2**4 QH**

Develops the basic theory of linear discrete systems. Discusses the representation of discrete signals and analyzes continuous waveform sampling and quantization. Develops the theory of shift-invariant, linear systems. Discusses FIR and IIR systems, recursive analysis, convolution, causality, and stability in detail. Develops the discrete Fourier transform and the Z-transform and then analyzes discrete signals and systems in the frequency domain. *Prereq. ECE 1332. ECE 1226 must be taken concurrently.*

ECE 1346 Electronics 1**4 QH**

Emphasizes the use of solid-state devices in digital circuits. Introduces semiconductor concepts leading to the p-n diode equation and Ebers-Moll equations. Develops large-signal linear diode models allowing the application of linear circuit theory to diode circuits. Studies FET and BJT devices and develops models of their characteristics. Shows applications of transistors to inverters and logic gates and introduces concepts of transfer characteristics, voltage thresholds, and noise margins. Studies binary values, logic operations, Boolean algebra, and symbolic logic gates with application to semiconductor circuits. Also studies fundamental circuits in the NMOS, CMOS, ECL, and TTL logic families. Considers transient capacitive effects in digital circuits and uses circuit simulation software to model diode and transistor circuits. *Prereq. ECE 1216.*

ECE 1347 Electronics 2**4 QH**

Covers the use of transistors for analog applications. Develops small signal models for diodes, field-effect transistors, and bipolar transistors. Studies discrete component and integrated circuit biasing techniques. Linearized incremental model characteristics are calculated for basic amplifier stages and for compound and cascaded amplifiers. Introduces the differential amplifier stage and applied with other stages creates a model operational amplifier design. Introduces device capacitive effects and the frequency responses for single and compound stages are calculated. Develops dominant-pole and time-constant techniques for estimating the frequency response and gain-bandwidth product of amplifiers and idealized op-amps. Emphasizes the design of multi-stage amplifiers to gain, impedance, and frequency specifications. *Prereq. ECE 1346. ECE 1224 must be taken concurrently.*

ECE 1349 Electronic Design 1**4 QH**

Introduces electronic circuit design concepts through operational amplifier architecture and applications. Studies the effect of feedback on sensitivity, impedance levels, gain and frequency response. Treats the stability criteria and the design of compensation

networks. Extends feedback concepts to the design of bistable, monostable, and astable circuits and analog-to-digital and digital-to-analog converters. *Prereq.* ECE 1347. *ECE 1225 must be taken concurrently.*

ECE 1350 Electronic Design 2 **4 QH**

Extends the techniques and concepts of ECE 1349 to a variety of signal processing circuits. Requires students to do at least three major circuit designs, which may include the following: active filters, analog multipliers, saw-tooth generators, sinusoidal oscillators, and electronic sensors. *Prereq.* ECE 1349.

ECE 1351 Special Topics in IC Design **4 QH**

Offers a structured digital MOS design course in designing, verifying, and fabricating CMOS VLSI integrated circuits. Introduces required design rules and relates them to the fabrication process. Begins design exercises and tutorials with basic inverters and proceeds to the design, verification, and performance of large complex digital logic networks. Develops a simple RC delay model in conjunction with the theory of delays in VLSI systems. Other topics include program logic arrays and automatic design tools, shift registers, arithmetic logic units, and memory systems. *Prereq.* ECE 1382. *ECE 1230 must be taken concurrently.*

ECE 1363 Electromagnetic Field Theory 1 **4 QH**

Introduces the fundamental equations of electromagnetics and their physical applications. Reviews the mathematics necessary to describe electromagnetic fields—vectors and complex phasors—and introduces vector calculus. Defines the electromagnetic field with the Lorentz force equation, and beginning with the experimental foundation of Ampere's and Faraday's laws, Maxwell's equations are developed in both integral and differential form. Studies electrostatics, magnetostatics, and macroscopic models of dielectric, magnetic, and conducting media as examples of field calculations with boundary conditions. The wave equation is derived and the uniform plane wave solution is studied in both time and frequency domain. Considers electromagnetic wave propagation in dielectric and conducting media and introduces Poynting's theorem. Studies the reflection and transmission of plane waves at a boundary. *Prereq.* MTH 1223, MTH 1225, and PHY 1224.

ECE 1364 Electromagnetic Field Theory 2 **4 QH**

Studies electrodynamic applications of electromagnetic field theory: transmission lines, waveguides, and antennas. Defines transmission-line voltage and current in terms of the TEM electromagnetic wave parameters and develops transmission line theory by use of distributed circuit elements. Uses Smith charts to obtain frequency-domain solutions analytically and also graphically. TM and TE solutions to the vector wave equation are found in parallel-plate waveguides and general rectangular metal waveguides. Examines dielectric waveguides after a study of uniform plane wave refraction. Investigates the radiation properties of electric dipoles and linear antennas and studies the enhancement of directivity in phased arrays. Covers wave topics including Doppler shift and optical fiber as time permits. *Prereq.* ECE 1363. *ECE 1227 must be taken concurrently.*

ECE 1365 Electromagnetic Fields and Energy Conversion **4 QH**

Focuses on the static and quasi-static solution of the electromagnetic field equations and emphasizes energy conversion and transducers. Topics include magnetostatics; magnetic materials and transducers; and magnetic circuits, transformers, and energy conversion concepts applied to DC, synchronous, and induction machines. *Prereq.* ECE 1364. *ECE 1228 must be taken concurrently.*

ECE 1371 Electrical Machines 1 **4 QH**

Reviews principles of electromechanical energy conversion. Discusses steady-state theory and performance of induction machines, synchronous machines, and direct-current machines. Introduces machine windings and transient performance of rotating machines. *Prereq.* ECE 1365. *ECE 1232 must be taken concurrently.*

ECE 1372 Electrical Machines 2 **4 QH**

Covers dynamic behavior of electromechanical devices; transient performance of synchronous machines; synchronous and induction-machine dynamics; and DC machine dynamics. *Prereq.* ECE 1371.

ECE 1379 Transients in Electric Power Systems **4 QH**

Introduces transient response in electrical power systems. Topics include lightning; switching; faults; and protection against transient overvoltages. Considers transmission lines, transformers, circuit breakers, surge arresters, and fuses in terms of transient response. *Prereq.* ECE 1333.

ECE 1381 Computer Engineering 1: Introduction to Computer Architecture **4 QH**

Presents a view of the architecture of a modern computer; the visible architecture provides the starting point. Uses assembly language programming to develop a foundation on the hardware which executes a program and shows what a compiler, assembler, and linker do and how they interact with the architecture. Explores data structures from a programmatic perspective (static storage, stack, and heap) and from a high-level language perspective (simple data types, and structured data types). Covers several types of computer number systems and arithmetic (2s-complement, IEEE floating point, and logical operations). Includes numerous programming exercises and a software design project to develop working facility with the tools and concepts that underlie the next three computer engineering courses. *Prereq.* GE 1101 or equivalent.

ECE 1382 Computer Engineering 2: Design of Digital Logic Machines and Circuits **4 QH**

Continues ECE 1381 with a bottom-up view of the design of logic machines, leading to the design of a simple digital computer by the end of the quarter. Covers Boolean switching algebra and gate-count minimization; combinational design; sequential circuits; state machines; PLA, PAL, and ROM realizations; CPU design, design of the ALU, and control unit design. Introduces CAD logic design tools. Requires a design project using SSI and MSI chips to develop facility in the design and testing of functional digital circuits. Proof of the circuit will be done using the CAD tools. *Prereq.* ECE 1381. *ECE 1229 must be taken concurrently.*

ECE 1383 Computer Engineering 3: Microprocessor-Based Design 4 QH

Provides an introduction to both hardware and software issues in interfacing microprocessors to their local and outside worlds. Includes lab and lecture components to develop both analytical understanding and design skills. Examines the following hardware items: bus characteristics, timing and protocols; memory organization; memory-mapped I/O; and interrupts. Studies complementary software topics including polling versus interrupt driven I/O and exception processing. *Prereq.* ECE 1381 and ECE 1382.

ECE 1384 Computer Engineering 4: Computer Organization and Design 4 QH

Provides a coherent, structured overview of the current state of Computer Organization and Design. Studies the strategies for attaining high performance using the instruction set of a real architecture. Focuses on the forces that drive cost/performance decisions to achieve successful designs. Highlights design principles based on the interactions of hardware and software. Topics include performance metrics, machine language, processor data path and control path designs, pipelining, memory hierarchies, I/O devices and interfacing techniques, and parallel processing. Provides a deeper understanding of design and performance issues in laboratory exercises using software simulators. *Prereq.* ECE 1383.

ECE 1385 Computer Engineering 5: Introduction to Robotics 4 QH

Teams two students together to design and implement a small mobile robot system to complete a specific task. Students compete their robots against robots built by other teams in the class at the end of the course. Develops students' design capabilities of microprocessor controlled systems with input from sensory devices and output actuators. Topics include actuators, sensors, and system modeling. *Prereq.* ECE 1333, ECE 1382, and ECE 1383.

ECE 1386 Computer Engineering 6: Structure of Large-Scale Computer Systems 4 QH

Studies the C++ programming language with an overview of object-oriented design in the first part of the course. A C++ tutorial will be provided. Focuses on high-performance computer architecture in the second part of the course. Includes microprocessor design, multiprocessors, memory coherency and consistency, and the hardware-software interaction. *Prereq.* ECE 1384.

ECE 1390 Senior Project Laboratory 1 2 QH

Allows students to work with a faculty adviser on a term project, either experimental or theoretical. *Prereq.* Permission of department.

ECE 1391 Senior Project Laboratory 2 2 QH

Continues the project started in ECE 1390 or it may be a new project. *Prereq.* Permission of department.

ECE 1400 Special Topics 4 QH

Covers various topics from term to term depending on the interests of the department and the students. *Prereq.* Permission of department.

ECE 1406 Integrated Circuit Fabrication 4 QH

Surveys integrated circuit fabrication from crystal growth to chip interconnection and packaging. Discusses fabrication and device theory in the classroom, closely tying these to the concurrent fabrication and testing of MOS integrated circuits in the laboratory

(ECE 1233). Covers the major processes used in all integrated circuit fabrication including lithography, film deposition, diffusion, ion implantation, and silicon oxidation. Discusses the p-n junction diode, MOS capacitors and transistors, and VLSI fabrication processes (NMOS, CMOS, and bipolar). *Prereq.* ECE 1347. ECE 1233 must be taken concurrently.

ECE 1408 Physical Electronics 4 QH

Develops elements of solid-state theory including wave mechanics, crystalline solids, semiconductor statistics, and electron transport theory to provide background for a thorough understanding of the junction diode. Explores ohmic contacts and Schottky barriers and the ways that these may be generated in individual and integrated form. Demonstrates how these elements are joined together to form BJTs and JFETs. *Prereq.* ECE 1347.

ECE 1420 Control Systems 4 QH

Comprises closely coupled lectures and laboratory experiments. Topics covered include control system concepts, basic components and goals, modeling and mathematical description, transfer function and state variable representations, feedback control system characteristics, system responses, stability of feedback systems, analysis of graphical tools such as root-locus and Nyquist diagram, compensator design based on root-locus and frequency response, and modern control system design. *Prereq.* ECE 1333 and ECE 1347. ECE 1235 must be taken concurrently.

ECE 1454 Communication Systems 4 QH

Presents fundamentals of digital and analog communication systems with emphasis on digital communication schemes. Topics covered include random processes and noise characteristics, information sources and source coding, analog communication systems, transmission of digital data through AWGN channels, transmission of digital data through bandwidth constrained channels, digital carrier modulation schemes, channel capacity, and coding. *Prereq.* ECE 1333 and MTH 1384.

ECE 1456 Digital Signal Processing 4 QH

Introduces concepts in modern signal processing. Topics include review of discrete time signals and systems, discrete Fourier transform, realizations structures for digital filters, FIR filter design, IIR filter design, fast Fourier transforms, and applications to fast convolution. *Prereq.* ECE 1333. ECE 1234 must be taken concurrently.

ECE 1458 Communication Networks 4 QH

Uses open systems interconnection (OSI) model as a framework for discussing design principles, management of complexity, standardized connectivity, and routing switching and multiplexing techniques used in networks to achieve connectivity and resource sharing. Topics include broadband integrated services digital networks (B-ISDN), personal communication networks (PCN), and techniques for modeling and evaluating network performance by analytical methods, simulations, or emulations. *Prereq.* ECE 1454.

ECE 1462 Advanced Topics in Electromagnetic Field Theory 4 QH

Continues the required courses in field theory. Topics include microwave and waveguide structures; careful development of electromagnetic energy and force concepts; and an introduction to radiation and antenna theory. *Prereq.* ECE 1364.

ECE 1465 Wave Transmission and Reception**4 QH**

Continues the introductory study in ECE 1364. Examines the transmission, radiation, and reception of electromagnetic waves at and above radio frequencies. Considers realistic lossy transmission lines, waveguides, and resonators. Studies striplines, microstrip lines, and the step function response of transmission lines and applications to digital signals. Also studies TE and TM modes in dielectric waveguides and optical fibers (step- and graded-index), the radiation field and receiving properties of several types of antennas (electric dipole, linear, loop, slot, etc.). Presents the Friis transmission formula for the complete antenna system and investigates broadband arrays (log-periodic, Yagi-Uda) and phased arrays. *Prereq.* ECE 1364.

ECE 1466 Modern Optics**4 QH**

Presents the basic optical concepts necessary for an understanding of quantum electronic devices. Analyzes the simple Lorentzian model of the interaction between electromagnetic waves and optical materials, modified to include necessary quantum concepts. Topics include propagation of electromagnetic waves in isotropic and non-isotropic media (crystal optics); reflection and refraction, polarization and double refraction; optical resonance and stability criteria; Gaussian beam propagation; systems with gain; coherent and non-coherent optical sources; and detection of optical signals. Considers specific devices including resonators, amplifiers, and oscillators; modulators and switches; and optical detectors. *Prereq.* ECE 1364.

ECE 1471 Electrical Power Systems I**4 QH**

Introduces electrical power systems, wherein three-phase circuits are analyzed under balanced steady-state operation. Topics include system elements and their characteristics and interaction, system modeling, network calculations, and an introduction to symmetrical components. *Prereq.* ECE 1332.

ECE 1472 Electrical Power Systems 2**4 QH**

Continues basic studies in electrical power systems. Topics include power system load-flow analysis, symmetrical components and fault calculations, system protection, economic operation of power systems, and an introduction to power system stability. *Prereq.* ECE 1471. ECE 1231 must be taken concurrently.

ECE 1474 Power Electronics**4 QH**

Presents the application of electronics to energy conversion and control. Studies phase-controlled rectifier circuits, DC-DC converters, high frequency inverters, and motion control systems. Examines power semiconductor devices: diode, bipolar and field effect transistors, and thyristors. Illustrates modeling, analysis and control techniques on numerous examples. *Prereq.* ECE 1347 and ECE 1365.

ECE 1484 Applied Discrete Analysis**4 QH**

Introduces elementary number theory, modern algebra, combinatorial mathematics and graph theory. Covers Euclid's algorithm, continued fractions, congruences, groups, rings, fields, lattices, Boolean algebra, combinations and permutations, generating functions, random variables, and Markov chains. *Prereq.* MTH 1225.

ECE 1486 Numerical Methods and Computer Applications**4 QH**

Presents numerical techniques used in solving scientific and engineering problems with the aid of digital computers. Topics include modeling and simulating of deterministic and probabilistic systems; theory of interpolation; least squares; numerical solution

of ordinary and partial differential equations using a programming environment such as MATLAB. Chooses representative problems for solution on a digital computer. *Prereq.* MTH 1225 and GE 1101.

General Engineering

The course descriptions listed under general engineering are intended to show the scope of the subject that will be covered. Since courses are continually updated, specific topics or methods of approach may vary from term to term.

GE 1101 Engineering Problem Solving and Computation**4 QH**

Uses developing and structuring approaches to solve engineering problems. Draws applications from a variety of engineering disciplines which serve as a tool for introducing students to engineering analysis and design. Includes the design of problem-solving algorithms along with an introduction to the "C" programming language.

GE 1102 Engineering Problem Solving with Application Software**2 QH**

Develops fundamental problem solving skills essential to all engineering disciplines. Introduces students to spreadsheet and math application packages and their use in solving engineering problems. Topics include data reduction and transformation, visualization of data and functions, problem structuring, and matrix applications. Examples stress real-life engineering analysis and design as a tool for introducing students to the engineering profession.

GE 1103 Engineering Design**4 QH**

Presents the engineering design process using case studies from a variety of engineering disciplines. Topics include problem formulation and specification, creativity, evaluation tools, patents, product liability, ergonomics, systems design, failure analysis, hazard prevention, manufacturing, ethics in engineering, and presentation techniques. Presents engineering graphics, focusing on developing three-dimensional visualization skills and computer-aided design (CAD) application. Students will develop an original design solution to a technical problem as a term project and use CAD software extensively.

GE 1701 Engineering Problem Solving and Computation (Honors)**4 QH**

Honors equivalent of GE 1101.

GE 1702 Engineering Problem Solving with Application Software (Honors)**2 QH**

Honors equivalent of GE 1102.

GE 1703 Engineering Design (Honors)**4 QH**

Honors equivalent of GE 1103.

Industrial Engineering and Information Systems

IIS 1200 Work Design**4 QH**

Covers the engineering design process, principles of work physiology, and workplace design from the standpoint of employee safety and effectiveness. Covers work measurement techniques, including direct measurement, synthetic standards, and work sampling. Includes a project in which principles of work design must be applied.

IIS 1300 Probabilistic Analysis for Engineers**4 QH**

Presents probability theory axiomatically, with emphasis on sample space presentation of continuous and discrete random variables. Covers descriptive statistics, expected value of random variables, moment generating functions, sampling distribution, and point and interval estimations. *Prereq.* *Integral and Differential Calculus.*

IIS 1310 Statistics**4 QH**

Examines the definition of a statistic, review of the distributions and approximations of random variables. Introduces hypothesis testing including tests of hypothesis for means, variances, and proportion. Covers nonparametric methods, analysis of variance, and simple linear regression. *Prereq.* *IIS 1300.*

IIS 1330 Principles of Computation and Programming I**4 QH**

Reviews algorithms, computers, and programming; machine language programming (instruction, execution, and addressing techniques); coding and representation of data; program debugging and verification. Surveys machines, devices, and languages. *Prereq.* *Higher-level language.*

IIS 1340 Operations Research I**4 QH**

Covers deterministic models, including LP and duality; transportation and allocation; sensitivity and post-optimality analyses; and network analysis, including maximal flow, shortest route, and PERT. *Prereq.* *MTH 1223.*

IIS 1341 Operations Research 2**4 QH**

Focuses on the stochastic models in operations research and their analytical development and solution. Topics include queuing models, deterministic and stochastic inventory models, Markov chains, and sequencing. Presents dynamic programming and recursive functional expressions. *Prereq.* *IIS 1310.*

IIS 1345 Management Information Systems**4 QH**

Examines the design and implementation of computer-based information systems. Topics include the value of information; tools of system analysis and design; impact of computer-based information systems on organizations and society; rudimentary computer architecture; input devices; data organization and storage; system configuration; communications; and output/display devices.

IIS 1350 Digital Simulation Techniques**4 QH**

Covers model design and development, validation, and experimentation for discrete event simulation models. Topics include problem formulation, data collection and analysis, random variable generation, and statistical analysis of output. Utilizes a major simulation language such as GPSS, SIMAN, or SIMSCRIPT. *Prereq.* *Higher-level language and IIS 1310.*

IIS 1360 Engineering Economy**4 QH**

Familiarizes the student with the theory and techniques of economic design and evaluation of an investment project. Presents steps in the analysis of investment proposals, time value of money, and cash flows. Analyzes cash flows in terms of present worth, annual cost, rate of return, and benefit/cost ratio. Studies effects of taxes on investment analysis. Utilizes mathematical and graphical models to evaluate candidate solutions to design alternatives.

IIS 1366 Engineering Economy**4 QH**

Covers the formulation of analytical techniques, such as rate of return, present worth, and annual cost. Considers the application of these techniques to solve business and engineering problems

involving design, selection, replacement, lease-buy decisions, and decisions among multiple alternatives. Studies sources and cost of capital, and the effect of taxes on the selection of investment alternatives. *Not open to industrial engineering majors.*

IIS 1400 Systems**4 QH**

Examines modeling, analysis, and control of linear feedback systems through consideration of the following topics: differential equations as system models; transfer functions and block diagrams; system components and the method of analogies; accuracy, and stability. *Prereq.* *MTH 1230.*

IIS 1401 Design Project**4 QH**

Examines analysis and design of major industrial engineering systems. Students are expected to undertake up to five projects drawn from line balancing, job shop scheduling, stochastic network analysis, reliability in design, complex queuing system design, sequencing, or other areas of student and faculty interest. *Prereq.* *Senior standing.*

IIS 1405 Production and Inventory Control**4 QH**

Explores design of basic inventory models and inventory management systems, single-stage and multi-stage systems and their dynamics, production control and aggregate planning, and mathematical and heuristic approaches to aggregate scheduling. Topics include cost structure and decision-oriented analyses, and consideration of job shop scheduling and dispatching problems. *Prereq.* *IIS 1310 and IIS 1340.*

IIS 1415 Facilities Design**4 QH**

Examines the use of descriptive and optimizing models (for example, simulation, queuing theory, and linear programming) to design facilities and associated materials-handling systems. Applies computer-assisted layout analysis techniques to problems of real-world scope. *Prereq.* *IIS 1340.*

IIS 1425 Material Handling System Design**4 QH**

Discusses the design and analysis of large material handling systems. Topics include computer control of handling systems, integration with production and inspection, automated storage/retrieval systems, automatic identification systems, and systems acquisitions. *Prereq.* *IIS 1340.*

IIS 1436 Quality Assurance**4 QH**

Covers basic principles to state-of-the-art concepts and application of statistical process control and design. Applies principles to a variety of products. Topics include measuring and controlling product quality, Shewhart control charts, quality cost, pareto analysis, discrete and variable sampling, and military standards in quality control. *Prereq.* *IIS 1310.*

IIS 1450 Expert Systems**4 QH**

Introduces students to the theory, topics, and applications of expert systems in engineering. Topics include knowledge representations formats (production rules, frames, networks, and logic systems), heuristics in engineering (deterministic and nondeterministic), fuzzy logic, certainty factors, cognition, memory, decision strategies, design of expert systems, shells, machine learning techniques, current research goals, and applications in engineering. Each student must complete a design project in expert systems development and/or application. *Prereq.* *GE 1100, IIS 1300, IIS 1330, or permission of instructor.*

IIS 1466 Manufacturing Automation**4 QH**

Familiarizes students with the process of manufacturing and potential for automation. Studies designing for automation including required hardware and software. Involves hands-on experience with robotics programming and implementation, programmable control programming, and CNC machine programming using APT and G code. *Prereq.* IIS 1330 and IIS 1465, or permission of instructor.

IIS 1470 Human Considerations in Engineering Design**4 QH**

Introduces human factors with emphasis on the physiological and anthropometric bases of equipment and workplace design. Topics include an overview of the field of human factors; work, fatigue, and endurance; thermal regulation and heat stress; biomechanics; effects of aging on work capacity; and body response to vibration.

IIS 1475 Human-Machine Systems**4 QH**

Emphasizes human sensory/motor performance, information-processing capabilities, learning, and skilled-task performance. Topics include an introduction to the experiment as a source of knowledge of human performance characteristics; vision, visual performance, and principles of display design; audition, noise, hearing damage, and auditory signals; information processing; signal detection; aging effects; and system development.

IIS 1777 Honors Adjunct**1 QH**

To be added to any 4 quarter hour course in the department when approved by the Honors Committee of the College of Engineering. Once approved, the adjunct information is forwarded to the Honors Office for dissemination to the honors membership. Students may enroll in IIS 1777 an unlimited number of times as it can be an adjunct to any industrial engineering course.

IIS 1800 Independent Study in Industrial Engineering**4 QH**

Allows independent study on advanced IE topics for students usually in the senior year and with high scholastic standing. Projects may be of an applied or theoretical nature. A formal report is submitted to student's project supervisor at the end of quarter.

Mechanical Engineering

ME 1201 Statics**5 QH**

Examines vector representation of force and moment; equivalent force systems; centroids and centers of gravity; and distributed forces. Investigates equations of equilibrium; free-body diagrams; applications to trusses, pin-connected frames, and beams; shear and moment diagrams; and elementary concepts in friction. Introduces virtual work. *Prereq.* PHY 1222.

ME 1202 Dynamics 1**5 QH**

Develops problem-solving ability in the fundamentals of dynamics. Topics include kinematics of particles, kinematics of rigid bodies, and mass moments of inertia. Examines kinetics of particles and rigid bodies using force, mass, and acceleration. *Prereq.* ME 1201.

ME 1203 Strength of Materials 1**5 QH**

Explores the concept of stress and strain; state of stress and strain at a point; and stress-strain relations and material properties. Investigates moment of inertia of areas; stress and deformation of simple members under axial and torsional loads; and stresses in symmetrical beam bending. Involves lab sessions to support the lectures. *Prereq.* ME 1201.

ME 1314 Strength of Materials 2**4 QH**

Covers asymmetrical bending; analysis of determinate and indeterminate beams by various methods; and buckling of columns. *Prereq.* ME 1203.

ME 1315 Dynamics 2**4 QH**

Continues development of problem-solving ability in dynamics. Topics include kinematics of rigid bodies using rotating frames, kinetics of particles and rigid bodies using work and energy, introduction of Lagrange's equations, kinetics of particles and rigid bodies using impulse and momentum, and simple gyroscopic motion. *Prereq.* ME 1202.

ME 1320 Dynamics for Civil Engineers**4 QH**

Covers kinematics, translating reference frames, mass moments of inertia, plane motion of rigid bodies, and instantaneous equations of motion. *Prereq.* CIV 1210.

ME 1321 Mechanics for Electrical Engineers**4 QH**

Focuses on the study of the mechanics of rigid bodies, instantaneous equations of motion, work and energy, and impulse and momentum. *Prereq.* PHY 1222.

ME 1335 Mechanical Design**5 QH**

Covers applications to the design process of the basic concepts of mechanics, strength of materials, and mechanical behavior of materials. Discusses basic considerations in design and its open-ended nature. Reviews fundamentals of stress and deflection analysis; theories of failure; design for fatigue strength; product liability; numerical methods in design, modeling, simulation; and optimization of mechanical systems. *Prereq.* ME 1314.

ME 1336 Design Project 1**5 QH**

Applies the engineering sciences to the design of a system, component, or process. Students will choose the particular design project with the approval of appropriate faculty. Design teams will be organized. Each project will include the use of open-ended problems, development and use of design methodology, formulation of design problem statements and specifications, consideration of alternative solutions, feasibility considerations, and detailed system descriptions. It should include realistic constraints (such as economic factors, safety, reliability, maintenance, aesthetics, ethics, and social impact). *Prereq.* ME 1335 and ME 1337.

ME 1337 Thermal Design**5 QH**

Focuses on developing the ability of the students to synthesize their knowledge and understanding of the concepts of thermodynamics, fluid mechanics, and heat transfer to meet the specifications of various thermal design objectives through the assignment of open-ended problems. Reviews fundamentals of heat transfer and fluid mechanics, numerical methods in heat transfer, heat transfer analysis of heat exchangers, heat exchanger pressure drop analysis, modeling, system simulation, and topics in optimization. One or more design projects are assigned. Utilizes various software on mainframe and microcomputers throughout the course and in the projects. *Prereq.* ME 1365.

ME 1338 Design Project 2**5 QH**

Continues the project started in ME 1336. Students remain in the same group and under the direction of the same faculty advisers as in ME 1336. These guidelines may be waived in exceptional cases with the department chair's approval. *Prereq.* ME 1336.

ME 1340 Thermodynamics**4 QH**

Studies the systems in which energy and its flow across systems boundaries are important. In this course, energy, heat, and work are defined and used in the First Law of Thermodynamics. Introduces other thermodynamic properties and equations of state, with emphasis on tabular and graphical forms for simple compressible systems and on the ideal gas. Introduces the Second Law of Thermodynamics and the property entropy, and discusses their macro- and microscopic implications. Concentrates on basic concepts and their proper application to representative engineering systems. *Prereq.* MTH 1223; *not open to mechanical engineering majors.*

ME 1360 Thermodynamics 1**5 QH**

Defines energy, heat, and work in the First Law of Thermodynamics. Introduces other thermodynamic properties and equations of state, with emphasis on tabular and graphical forms for simple and compressible systems on the ideal gas. Discusses phases and phase transitions, and examines energy analysis of both open and closed systems. Introduces macro- and microscopic implications of the Second Law of Thermodynamics and the property entropy, and discusses their macro- and microscopic implications. Emphasizes the macroscopic consequences of irreversibility and the limitation this places, through the Second Law, on the behavior of engineering systems. This course meets four times weekly and integrates problem-solving strategies while concentrating on basic concepts. *Prereq.* MTH 1223 *taken concurrently.*

ME 1361 Thermodynamics 2**5 QH**

Studies of vapor power systems including the Rankine cycle and its modifications for use with both fossil and nuclear fuels, vapor refrigeration systems, and all-gas cycles including the Brayton cycle and its modifications; the Otto cycle; the Diesel cycle; and supercharging and turbo-charging. Introduces the concepts of availability and irreversibility and thermodynamics of nonreacting mixtures with applications to air/water/vapor mixtures for air-conditioning systems and cooling towers. Discusses the elements of optimum power plant design. *Prereq.* ME 1360.

ME 1362 Thermodynamics 3**5 QH**

Continues the thermofluids sequence. Topics include thermodynamic relations using generalized charts; reacting gas mixtures and combustion; and chemical equilibrium. Introduces one-dimensional compressible flow, including isentropic flow with area change; and normal shock waves. Includes a lab. *Prereq.* ME 1361.

ME 1365 Heat Transfer**5 QH**

Studies the theories that describe conduction, convection, and thermal radiation heat transfer mechanisms. Discusses steady-state and transient conduction problems in rectangular, cylindrical, and spherical coordinate systems. Studies convective heat transfer mechanisms, and introduces various correlations. Presents a description of thermal radiation heat transfer between surfaces. Includes various lab experiments. *Prereq.* ME 1360, ME 1375, and MTH 1226.

ME 1375 Fluid Mechanics**5 QH**

Studies fundamental principles in fluid mechanics. Topics include hydrostatics (pressure distribution, forces on submerged surfaces, and buoyancy); Newton's law of viscosity; dimensional analysis; integral forms of the basic laws (conservation of mass, momentum, and energy); pipe flow analysis; and differential formulation of basic laws with laminar flow analyses. Includes labs and a computer project. *Prereq.* ME 1360 and MTH 1225.

ME 1380 Materials Science**5 QH**

Introduces materials science for engineers, emphasizing the structure/property/function relation. Topics include crystallography, structure of solids, imperfections in crystals, phase equilibrium, phase transformations, diffusion, and physical/electrical properties. Includes a lab. *Prereq.* CHM 1132 and ME 1360.

ME 1386 Materials Science**4 QH**

Introduces materials science for engineers, emphasizing the structure/property/function relation. Topics include crystallography, structure of solids, imperfections in crystals, phase equilibrium, electrical and magnetic properties of metals, semiconductors and junctions. *Prereq.* CHM 1132.

ME 1392 Measurements and Analysis**5 QH**

Examines design of experiments, instrumentation, measurements, data analysis, and report writing. Applies the principles developed in class to a variety of lab experiments. Requires written reports. Topics include force, strain, rotational frequency, temperature, pressure, power, and A/D conversion techniques. Lab fee.

ME 1401 Advanced Strength and Applied Elasticity**4 QH**

Covers analysis of curved beams, rings, and thick-walled pressure vessels; introduction to plane elasticity problems using rectangular and polar coordinate systems; and concepts of stress and strength. *Prereq.* ME 1314.

ME 1408 System Analysis and Control**4 QH**

Explores the theoretical background necessary to analyze and design simple linear control systems. Focuses on system modeling, linear approximations and their limitations, transfer functions, and block diagrams; transient and frequency response; and stability. Discusses frequency domain and root locus techniques. *Prereq.* ME 1315.

ME 1415 Mechanical Vibrations**5 QH**

Studies free and forced vibrations of undamped and damped one-degree-of-freedom systems. Includes rotational unbalance, support motion, vibration isolation, vibration measuring equipment, non-viscous damping, general periodic excitation, non-periodic excitation using numerical methods. Examines free and forced vibration of multi-degree-of-freedom systems, the vibration absorber, coordinate coupling, and normal modes of vibration. *Prereq.* ME 1202.

ME 1435 Computer-Aided Design**4 QH**

Introduces the concepts of computational and numerical geometry for design. Includes the implementation of computer graphics in design and use of computer-aided design packages. Covers principles of numerical control techniques to design and manufacture. Requires a design project. *Prereq.* GE 1103 and ME 1314.

ME 1436 Advanced Computer-Aided Design**4 QH**

Covers advanced applications of interactive graphics concepts to different engineering tasks including animation; solid modeling; numerical control; mass properties; finite element modeling and analysis; and other traditional engineering analysis. Presents advanced concepts and features of interactive graphics and analysis programming languages. Includes FORTRAN interface and CAD/CAM packages to give students hands-on experience in lab settings. Requires a design project. *Prereq.* ME 1435.

- ME 1470 Fluid Mechanics 2** 4 QH
Covers velocity potential and stream functions; circulation and Kelvin's theorem; two-dimensional, steady irrotational incompressible flow; and Karman-Pohlhausen method applied to two-dimensional boundary layers. *Prereq.* ME 1375.
- ME 1473 Gas Dynamics** 4 QH
Focuses on application of the principles of fluid mechanics to compressible flows. Discusses wave propagation and the concepts of sound speed and Mach number. Emphasizes one-dimensional steady flows including the effects of area change, friction, and heat transfer. Considers normal shock waves and the possibility of choking. *Prereq.* ME 1375.
- ME 1480 Mechanical Behavior of Materials** 4 QH
Studies the physical basis for the mechanical behavior of solid materials, including elasticity, plasticity, viscoelasticity, and fracture. Discusses structural alloys and polymers. *Prereq.* ME 1203 and ME 1380.
- ME 1483 Materials Processing** 4 QH
Surveys the essential features and materials limitation of various methods for processing materials. Topics include heat treatment (ferrous and nonferrous alloys), casting, forming, joining, and machining. *Prereq.* ME 1380.
- ME 1490 Special Topics** 4 QH
When offered, topics will vary depending on the interests of a group of students and/or of the department. *Prereq.* Permission of the department.
- ME 1496 Mechanical Engineering Project 1** 4 QH
Involves a project of an analytical or experimental nature. Each student must, before the end of the first week of the quarter, obtain written approval for a proposed project from the department chair and a department faculty member under whom the student will work. A formal report must be submitted to the faculty supervisor at the end of the quarter. *Prereq.* Senior standing.
- ME 1497 Mechanical Engineering Project 2** 4 QH
Continues ME 1496. *Prereq.* ME 1496.
- ME 1545 Internal Combustion Engines** 4 QH
Presents the concepts and theories of operation of internal combustion engines based upon the fundamental engineering sciences of thermodynamics, gas dynamics, heat transfer, and mechanics. Discusses the design and operating characteristics of conventional spark-ignition, compression-ignition, Wankel, and stratified charge spark-ignition engines. Includes performance analysis using computer programs and Newhall-Starkman charts. *Prereq.* ME 1362.
- ME 1580 Engineering Materials** 4 QH
Discusses the utilization of materials science in the application and selection of materials. Topics include reactions with environment, such as oxidation and corrosion; materials selection criteria; and materials engineering case studies dealing with materials selection and failure analysis. *Prereq.* ME 1380.
- ME 1702 Dynamics 1 (Honors)** 5 QH
Honors equivalent of ME 1202. The honors section will meet as a separate recitation section for additional lectures and other activities related to the theory and applications of dynamics. *Prereq.* ME 1201.
- ME 1703 Strength of Materials 1 (Honors)** 5 QH
Honors equivalent of ME 1203. The honors section meets separately for lab and other activities related to the theory and applications of strength of materials. *Prereq.* ME 1201.
- ME 1760 Thermodynamics 1 (Honors)** 5 QH
Honors equivalent of ME 1360. The honors section will meet as a separate recitation section for additional lectures and other activities related to the theory and applications of thermodynamics. *Prereq.* MTH 1223 taken concurrently.
- ME 1765 Heat Transfer (Honors)** 5 QH
Honors equivalent of ME 1365. The honors section meets separately for lab and other activities related to the theory and applications of heat transfer. *Prereq.* ME 1360, ME 1375, and MTH 1226.
- ME 1777 Honors Adjunct** 1 QH
To be added to any 4 QH course in the department when approved by the Honors Committee of the College of Engineering. Once approved, the adjunct information is forwarded to the honors office for dissemination to the honors membership. Students may enroll in ME 1777 an unlimited number of times as it can be an adjunct to any mechanical engineering course.
- ME 1796 Undergraduate Honors Thesis 1** 4 QH
Involves an analytical or experimental project. Before the end of the first week of the quarter, each student must obtain written approval for a proposed project from a department faculty member under whom the student will work and from the College of Engineering's Honors Committee. A formal report must be submitted to the faculty supervisor at the end of the quarter. *Prereq.* Junior or senior standing in the honors program.
- ME 1797 Undergraduate Honors Thesis 2** 4 QH
Continues ME 1796. *Prereq.* ME 1796.

Engineering Technology

Computer Technology

CT 1150 Computer Organization

4 QH

Presents basic computer architecture. Topics include number systems' operation and conversion, logic circuits, registers, data busses, ROM/RAM, microcomputer structure and operation, microprocessor internal components, microprocessor programming, and input/output processing.

CT 1311 Programming with C Language

4 QH

Presents C++ which is used to introduce students to Object Oriented Programming (OOP). Covers functions, arrays, pointers, classes and abstraction, operating overloading, inheritance, virtual functions, polymorphism, and templates. A project is required.

Prereq. GET 1100.

CT 1315 FORTRAN Laboratory

2 QH

Examines elements of the FORTRAN language with emphasis on structured programming. Topics include matrices, subroutines, functions, random number generators, and file handling. Students use the University's computer laboratory facilities to run programs.

Prereq. CT 1311 or CT 4311.

CT 1330 Data Structures

4 QH

Introduces methods of representing and manipulating data in computer memory. Topics include stacks, queues, lists, trees, heaps, sets, graphs, searching, and sorting. *Prereq. CT 1311.*

CT 1335 Numerical Methods

4 QH

Presents computer methods for solving mathematical problems. Involves writing and running application programs using the University's computer facilities. Covers deterministic versus stochastic methods, random number generators, iterative versus noniterative solutions, maxima and minima in two and three variables, curve fitting in two and three variables, integrals, trapezoidal and Simpson's rules, slopes, difference equations in two and three variables, vector and matrix algebra, simultaneous linear equations, nonlinear equations, permutations, and combinations. *Prereq. CT 1311 and MTH 1195.*

CT 1340 Software Engineering Design

4 QH

Offers structured methods for developing complex computer software. Provides students the opportunity to develop structured specifications, structured designs, and computer programs for complex problems and to test those programs using the University's computers. Topics include partitioning, hierarchical organization, data flow diagrams, data dictionaries, structured English, decision trees, decision tables, structured charts, team design, structured programs, and maintainability. *Prereq. CT 1330.*

CT 1345 Assembly Language

4 QH

Teaches typical microprocessor assembly language. Involves writing and running programs on a 68000 microprocessor-based system. Covers CPU architecture, instruction sets, addressing modes, binary operation, code conversion, subroutines, macros, and input/output. *Prereq. CT 1311 and CT 1150.*

CT 1348 LISP

4 QH

Introduces an interactive language in which the LISP interpreter is commonly referred to as the read-evaluate-print loop. Discusses LISP's various levels of implementation in detail. Explores LISP as an excellent medium for implementing standard techniques in data-structure manipulation, techniques for recursion, complex data structures, storage management, and symbol-table manipulation. *Prereq. CT 1330.*

CT 1351 Advanced Computer Organization

4 QH

Examines the functional characteristics of complex and special-purpose computer systems, the functions of a general-purpose multiuser, and a multiprocessing operating system. Advanced topics include virtual memory and virtual machine architectures, distributed and multiprocessor systems, array processors, and system performance analysis. *Prereq. CT 1356 and CT 1375.*

CT 1355 Microprocessor Peripheral Hardware

4 QH

Covers the elements of microprocessor peripheral hardware and its interfacing. Involves designing and analyzing microprocessor systems, including detailed schematics, timing diagrams, and technical documentation. Topics include serial input/output devices, DMA and interrupt control devices, standard busses, bus arbitration techniques, and bus support VLSI. *Prereq. CT 1374.*

CT 1356 Complex Peripheral Hardware

4 QH

Studies the interfacing and implementation of complex peripheral systems. Topics include disk and tape interfaces, graphic display devices, communication interfaces and subsystems, and input/output processors. *Prereq. CT 1355.*

CT 1360 Industry Software

4 QH

Surveys current commercial software packages and methods. Involves the exercise of commercial packages implemented on the University's computer facilities where applicable. Topics include specific current packages and methods drawn from the categories of database management, scientific and statistical analysis, security and privacy, software assurance, and documentation. *Prereq. CT 1381.*

CT 1363 Concurrent Programming

4 QH

Examines the principles of concurrent programming. Involves writing and running programs to demonstrate aspects of concurrent programming techniques and issues. Explores correctness of concurrent programs, material exclusion, the timing of Dekker's algorithms, the producer-consumer problem, monitors, semaphores, "Ada Rendezvous," critical regions, and conditional variables. *Prereq. CT 1330 and CT 1340.*

CT 1365 Industry Hardware

4 QH

Discusses the latest industrial developments and trends in computer hardware. Conducted as a seminar. *Prereq. CT 1356.*

CT 1368 Semiconductor Logic

4 QH

Analyzes the bipolar and MOS transistors in saturated and cutoff conditions. Examines implementing these concepts to form basic logic circuits and standard logic families, and to convert logical expressions into hardware configuration representations. Topics include Ebers-Moll modeling, PMOS, NMOS, CMOS, bipolar characteristics, and standard logic families. *Prereq. EET 1152.*

- CT 1369 Computer Logic** 4 QH
Introduces the hardware building blocks of digital computers. Teaches students to specify configurations of gates and memory components to achieve combinational and sequential composite logical functions, and perform finite state machine design and analysis. Topics include gates, flip-flops, registers, decoders, ALUs, memory arrays, and synchronous and asynchronous state machines. *Prereq.* CT 1368.
- CT 1374 Introduction to CPU Hardware** 4 QH
Introduces the circuits and operation of a microcomputer. Studies the microprocessor and its basic support components and circuits, including detailed timing and functional analysis of their interactions. Topics include central processing unit, memory, addressing, clocking, bus concepts, interrupts, coprocessors, input/output, and instruction timing. *Prereq.* CT 1345 and CT 1368.
- CT 1375 CPU Architecture** 4 QH
Presents high performance microprocessor architecture and hardware interfacing techniques. Analyzes current commercial processors and their support components. Topics include internal CPU architecture, memory management, instruction prefetch, privilege states, bus cycles, control lines, input/output, interrupts, exceptions, and pipelining. *Prereq.* CT 1374.
- CT 1377 VLSI Design** 4 QH
Introduces Very Large Scale Integration (VLSI) integrated circuits (ICs), the key components of all modern computers. Examines MOS devices, circuits, design methods, and fabrication techniques used in producing custom VLSI ICs. Topics include MOS transistor characteristics; basic gate circuits; scaling; layout tools, both manual and automated; wafer-fabrication techniques; standards; testing; and costs. *Prereq.* CT 1369.
- CT 1380 Data Communication Methods** 4 QH
Discusses the ISO Open Systems Interconnect model for communication systems, including the functional and operational aspects of data communication devices and software. Uses a black box approach. Topics include modems, control units, multiplexers, concentrators, front-end processors, and error checking. *Prereq.* CT 1375.
- CT 1381 Operating Systems** 4 QH
Introduces the basic principles and organization of operating system implementation. Topics include processor management, process multiplexing and synchronization, schedules, atomic operations and mutual exclusion, sequential and concurrent programming, memory, and device and data management. *Prereq.* CT 1330.
- CT 1383 Databases** 4 QH
Examines database organization structure and management. Involves writing and running programs exemplifying techniques developed in class, using the University's computer facilities. Topics include access methods, attributes, indices, keys, querying, searching and matching, file sets, inverted file sets, normal forms, and random access. *Prereq.* CT 1330.
- CT 1387 Bit-Slice Micracomputers** 4 QH
Demonstrates the basic design ground rules common to the bit-slice CPU style of hardware design. *Prereq.* CT 1355.
- CT 1389 Single-Chip Microprocessors** 4 QH
Explains the hardware limitations of a single-chip system. When small 8-bit intelligent devices are rewired in high volume, the single-chip microprocessor in the form of the 3870, 8084 Z8, and others comes into play. *Prereq.* CT 1374.
- CT 1390 Special Problems in Computer Technology** 4 QH
Students perform theoretical or experimental work under individual faculty supervision. *Prereq.* Permission of department chair.
- CT 1391 Topics in Computer Technology** 4 QH
Focuses on advanced topics in Computer Technology to be selected by the instructor. *Prereq.* Permission of the instructor.
- CT 1393 UNIX Operating System** 4 QH
Surveys advanced topics related to UNIX and its filing system. Studies the advance features in the editor and system utilities as well as the general theory of an operating system with emphasis on the relationship between the kernel, filing system, and standard libraries. Discusses low level I/O, forks, pipes, and signaling and introduces the use of *nmoff*, *sed*, *lint*, *cc*, *lex*, and *yacc*. *Prereq.* CT 1330.
- CT 1395 Computer Security** 4 QH
Focuses on issues related to security in computing, including the history of security, encryption techniques and applications, secure communications, and software protection. Covers software verification and validation, security design in hardware, and products currently available for recurring systems and data. Discusses privacy as well as reliability. *Prereq.* CT 1380.
- CT 1396 PROLOG: An Introduction to Artificial Intelligence** 4 QH
Introduces fundamental artificial intelligence (AI) terms and techniques using PROLOG as a programming language. Topics include knowledge representation, search, parsing, logic, and inference techniques. Uses student projects as an integral part of the course. *Prereq.* CT 1330.
- CT 1397 Advanced UNIX Programming** 4 QH
Studies the design and development of C application programs that interface with the UNIX operating system kernel. Enables C programmers to interact with the UNIX operating system through system calls and library routines. Topics include system programming tools, fundamental concepts, file creation and access, signal and signals handling, multitasking, file and terminal I/O, process creation and programming execution, and forms of interprocess communication and synchronization (pipes, message queues, semaphores, and shared memory). Students use the University's computer facilities to prepare course assignments. *Prereq.* CT 1393.
- CT 1480 Local Area Networks 1** 4 QH
Introduces local area network (LAN) concepts, architectures, application, protocols, and components. Focuses on first three layers of the ISO reference model: physical, data line, and network layers. Examines Ethernet, SNA, Token Bus, Token Ring, and other IEEE standards. *Prereq.* CT 1380. Not open to students who have taken CT 1379.
- CT 1481 Local Area Networks 2** 4 QH
Examines the upper four layers of the ISO reference model; transport, session, presentation and application layers. Topics include TCP/IP, DECNET, NETBIOS, FTP, TELNET, and E-MAIL. *Prereq.* CT 4480 or CT 1480.

CT 1492 Independent Study in Computer Technology**4 QH**

Independent study of advanced computer technology projects for students usually in the upper junior or senior year having high scholastic standing. Projects may be of an applied or theoretical nature resulting in a formal report submitted to the project supervisor at the end of the quarter. *Prereq.* *Permission of advisor and project supervisor.*

Electrical Engineering Technology

EET 1151 Circuit Analysis 1**4 QH**

Examines Ohm's law, Kirchhoff's current and voltage laws, equivalent resistances, independent and dependent sources, mesh and nodal analysis, and power relations, all concentrating on direct current circuits. Other topics include Thevenin and Norton theorems, the operational amplifier, and energy storage elements such as capacitors and inductors. *Prereq.* *MTH 1193 or PHY 1193.*

EET 1152 Circuit Analysis 2**4 QH**

Studies time domain (transient) analysis of R, L, and C elements; energy storage in L and C circuits; and responses in source-free RL and RC circuits. Includes application of the unit step function and response of RLC circuits. Introduces frequency domain methods to solve sinusoidal steady-state circuits using complex frequency concepts and phasor algebra. *Prereq.* *EET 1151.*

EET 1310 Electrical Measurements**4 QH**

Covers standards of measurements, dimensional analysis, errors and measurement of dispersed data, discrete and continuous variables, binomial distribution, and normal distribution. Topics include guaranteed error, methods of resistance measurements, digital voltmeters and analog-to-digital conversion, voltage references, and potentiometers and AC bridges. *Prereq.* *EET 1353.*

EET 1311 Electronics 1**4 QH**

Introduces elements of digital electronics, starting with the binary number system and proceeding to Boolean algebra and DeMorgan's theorems. Discusses combinatorial logic in detail and the basic circuitry to realize AND, OR, and NOT devices. Gives an introduction to sequential logic and the bistable devices required to realize it. Proceeds to the basic sequential circuits such as counters and shift registers. Includes the analysis and design of both combinatorial and sequential circuits. *Prereq.* *EET 1152.*

EET 1312 Electronics 2**4 QH**

Reviews the theory of linear circuits and extends it to simple non-linear circuits of both the two-terminal variety and the three-terminal variety. Considers the solid-state theory of the PN diode as an example of the two-terminal non-linear device, and the NPN, PNP, and field-effect devices as examples of the three terminal non-linear elements. Includes light-sensitive and heat-sensitive solid-state devices. Considers the problem of selecting an operating point for a non-linear device, and the corresponding practical methods of providing the required biases. Introduces the small-signal linear model for the non-linear device in the vicinity of the operating point. *Prereq.* *EET 1152, PHY 1193.*

EET 1313 Electronics 3**4 QH**

Reviews small-signal models for three-terminal devices and discusses frequency response of such models, including the Bode asymptotic approximation to frequency response. Also reviews Mason's signal flow graph concepts for determining transfer func-

tions. Examines operational amplifiers including their ideal behavior and the limitations introduced by finite input and output impedances, finite gain, and finite bandwidth. Explores feedback and stability problems that can occur when using operational amplifiers. Studies applications of feedback to oscillators and active filters. *Prereq.* *EET 1312.*

EET 1314 Pulse and Digital 1**4 QH**

Reviews the basic concept of Boolean algebra, combinatorial logic, and binary arithmetic, and extends them to the design of coding systems such as binary, binary-coded decimal, Gray code, seven-segment displays, and multiplexers. Introduces flip-flops and sequential logic circuits such as ripple counters, synchronous counters, ring counters and Johnson counters, shift registers, solid-state memory devices, and the 555 timer. Emphasizes design of digital systems using the available microelectronic gates, primarily in the TTL series. *Prereq.* *EET 1313.*

EET 1315 Pulse and Digital 2**4 QH**

Examines the physical devices that are used to realize digital circuits, as a complement to the previous treatment of idealized mathematical models. Introduces the concepts of rise-time, fall-time, set-up time, hold time, delay time, and the maximum frequency of a clock. Discusses the presently available logic families such as TTL, CMOS, and EC, compares them, and considers the problems of interconnecting them. Introduces memory elements and field-programmable logic elements. Presents interfacing devices such as analog-to-digital and digital-to-analog converters. *Prereq.* *EET 1314.*

EET 1317 Principles of Communication Systems 1**4 QH**

Focuses on signal analysis using Fourier methods, noise in communication systems, frequency selective amplifiers, including wideband, transistor power amplifiers AF and RF, oscillators, and signal sources and applications. *Prereq.* *EET 1313.*

EET 1318 Principles of Communication Systems 2**4 QH**

Explores basic theory of amplitude, frequency, phase and pulse code modulated systems, analysis of modulating and demodulating circuits. Topics include carrier systems using SSB, system block and level diagrams, logic control circuits in communication systems, and modems. *Prereq.* *EET 1317.*

EET 1319 Principles of Communication Systems 3**4 QH**

Emphasizes the fundamentals of digital communications, sampling requirements, analog-to-digital conversion methods, and system capacity and bandwidth. Topics include comparison of practical digital systems PAM, PCM, PFM, PWM, time and frequency division multiplexing, data decoding, and selected examples from telemetry and computer links. *Prereq.* *EET 1318.*

EET 1320 Electricity and Electronics 1**4 QH**

Introduces circuit analysis, resistive networks, periodic excitation function, steady state AC circuits, the physical foundations of electronics, and the physical operation of electronic devices. *Prereq.* *MTH 1193 and PHY 1193. Not open to electrical engineering technology majors.*

EET 1321 Electricity and Electronics 2**4 QH**

Examines single-stage electronic circuits, magnetic circuits and transformers, electro-mechanical energy conversion, DC machines, and AC machines. *Prereq.* *EET 1320.*

EET 1323 Electronic Laboratory**2 QH**

Offers experiments with nonlinear semiconductors. Explores junction and zener diodes. Studies typical applications in clippers, clampers, rectification, filtering, electronic power supplies, voltage regulation, and integrated circuit regulators. Discusses bipolar and field effect transistors, amplifiers and voltage follower configurations, special semiconductors, and operational amplifiers. *Prereq. EET 1311.*

EET 1324 Circuits Laboratory 1**2 QH**

Offers experiments in DC electrical circuits and measurement techniques. Includes use of ammeters, ohmmeters, voltmeters, VOMs, and power supplies. Studies equivalent resistance, series and parallel circuits, Ohm's law, Thevenin and Norton theorems, and superposition and maximum power transfer theorems. *Prereq. EET 1151.*

EET 1325 Circuits Laboratory 2**2 QH**

Offers further experiments in electrical circuits and measurement techniques. Includes operation of oscilloscopes, audio frequency, and function generators. Explores inductance and capacitance, and the effect of frequency upon them. Studies amplitude, frequency, and phase shift measurements using a variety of series/parallel RL, RC, and RLC circuitry. Examines circuit time constants and their relation to repetition rate, along with resonance, circuit quality, and filter circuits. *Prereq. EET 1124.*

EET 1327 Advanced Electronics Laboratory 1**2 QH**

Offers experiments using oscilloscopes, the examination of transistor audio amplifiers, push-pull amplifiers, drivers, pulse and video amplifiers. Topics include transients and wave-shaping circuits, audio frequency oscillators, and the study of operational amplifiers. *Prereq. EET 1323.*

EET 1328 Advanced Electronics Laboratory 2**2 QH**

Experiments with the modulation of a class C amplifier, the diode detector, basic timing circuits, RF and crystal oscillators, astable multivibrators, logic gates, flip-flops, binary adders, registers and counters. Topics include active filters, frequency modulation detectors, and analog-to-digital and digital-to-analog conversion. *Prereq. EET 1327.*

EET 1329 Advanced Electronics Laboratory 3**2 QH**

Studies FM and PM waves, amplitude limiters, the balanced modulators and single sideband generators. Discusses integrated circuit timers and monolithic random access memory, and monolithic phase-locked loop, as well as a series of microwave experiments and digital experiments. *Prereq. EET 1328.*

EET 1330 Energy Conversion**4 QH**

Investigates generalized theory of rotating energy conversion devices, steady-state operation of the multiply-excited direct-current machine, control of speed, special machines, transformers, steady-state considerations of induction and synchronous machines. Explores the generalized machine and circuit model, and Laplace transform techniques applied to the analysis of dynamic operating modes of rotating machines. *Prereq. EET 1152 and MTH 1195.*

EET 1337 Distributed Systems**4 QH**

Examines radiation, transmission, and reception of electromagnetic waves, distributed-line constants and traveling waves of transmission lines, and differential equations of the uniform line. *Prereq. MTH 1195 and PHY 1193.*

EET 1353 Circuits Analysis 3**4 QH**

Introduces three-phase circuits and three-phase, single-phase systems. Examines the application of differential equations to the solutions of linear, time-invariant electrical networks. Introduces singularity functions, convolution, and time domain transient analysis; network topology and duality; and the methods of transformation calculus and complex frequency concepts. *Prereq. EET 1152.*

EET 1354 Circuits Analysis 4**4 QH**

Explores the Bode asymptotic frequency response approximation and the concept of Mason's signal flow graphs. Focuses on signal analysis in the frequency domain, Fourier series, Fourier and Laplace transform methods, and a varied selection of circuit problems using Laplace transforms and related theorems. *Prereq. EET 1353.*

EET 1360 Engineering Analysis 1**4 QH**

Studies linear algebra and circuit equation applications, as well as solution of linear differential equations, including an introduction to Laplace transforms. *Prereq. EET 1152 and MTH 1195.*

EET 1362 Basic Power Systems 1**4 QH**

Focuses on power transmission lines, line constants, current voltage and power relations, electric-power distribution loads, feeders, and substations, and application of matrices. *Prereq. EET 1354.*

EET 1363 Basic Power Systems 2**4 QH**

Investigates symmetrical and asymmetrical faults, protective devices—application and coordination, power flow in electric circuits, steady-state power limitations of systems, and voltage regulation theory and application. *Prereq. EET 1362.*

EET 1364 Basic Power Systems 3**4 QH**

Offers computer applications to power systems with emphasis on load-flow studies, basic ideas of systems planning, short-circuit studies, and system stability. *Prereq. EET 1363.*

EET 1370 Digital Computers 1**4 QH**

Introduces digital computer design. Topics include general computer organization, number systems and number representations, design characteristics of major computer units, and Boolean algebra applications to computer design. *Prereq. EET 1311.*

EET 1371 Digital Computers 2**4 QH**

Examines microprocessor architecture and organization. Studies the machine language and assembly coding of an industry-accepted microprocessor, and a suitable topic from the current literature. Assembly language coding problems assigned. *Prereq. EET 1370.*

EET 1377 Control Engineering 1**4 QH**

Analyzes linear servomechanisms under both transient and steady-state conditions, signal flow graphs, and Laplace transforms in the formulation of block diagrams and transfer function. *Prereq. EET 1354 and MTH 1195.*

EET 1378 Control Engineering 2**4 QH**

Focuses on system stability, root locus techniques, and treatment of Nyquist criteria and Bode diagram methods for systems evaluation. *Prereq. EET 1377.*

EET 1390 Optical Instrumentation**4 QH**

Focuses on telescopes, microscopes, and similar equipment, as optical system components. Includes magnification, aberrations, resolution criteria, photometry, compatibility of system components and optimization of systems, and the basic nonimage-forming systems used for analysis control and metrology. *Prereq. MTH 1192 and PHY 1193.*

EET 1399 Special Problems in Electrical Engineering Technology**4 QH**

Offers theoretical or experimental work under individual faculty supervision. *Prereq. Permission of department chair.*

General Engineering Technology

GET 1100 Computer Programming for Engineering Technology**4 QH**

Introduces computers for problem solving using C++ language. Topics include data types, arithmetic and logical expressions, programming loops, decision making, functions, arrays, and character string manipulation. Offers the use of the University's computer facility to run programs. *Prereq. MTH 1191 or taken concurrently.*

GET 1105 Computer Applications for Tech**4 QH**

Studies the basics of computing in a microprocessor environment (DOS, Windows, MAC, word processing, databases, spreadsheets) with emphasis on applications relevant to technology students. Provides a solid foundation upon which students can develop more extensive computer expertise. Acquired skills are transferable to subsequent courses; cooperative education assignments; and personal and professional endeavors.

GET 1170 Engineering Graphics 1**4 QH**

Introduces manual and computer engineering drawing using geometric constructions, charts, and graphs. Geometric construction includes descriptive geometry, orthographic projection, sections, and isometric drawing.

GET 1171 Engineering Graphics 2**4 QH**

Studies computer and manual drawing in layout and assembly graphics. Topics include manufacturing processes, fasteners, gears, welding, electric/electronic drawing, architectural/structural drawing, piping, and topography. Design project required. *Prereq. GET 1170 or equiv.*

GET 1320 Engineering Ethics 1**1 QH**

Uses a case-study approach to examine basic ethical issues likely to confront engineering students on co-op and in their after-graduation professional practice. Attention is given to issues such as licensing, dissent with management, employee responsibilities, trade secrecy versus publication rights, advertising, and product liability. Discusses these issues in the context of the codes of engineering ethics of the engineering societies and general ethical theory. *Prereq. Middler standing or permission of instructor.*

GET 1356 Engineering Economy**4 QH**

Presents fundamental accounting concepts and terminology, including assets, liability, net worth, and analyzing income statements and balance sheets. Discusses introductory steps in analyzing investment proposals, time value of money, and cash flows. Analyzes cash flows in terms of present worth, annual worth, rate of return, and benefit/cost ratio. Considers depreciation and tax effects on cash flows. *Prereq. MTH 1191.*

GET 1364 Kinematics**4 QH**

Studies four-bar linkages, sliders, and others, using orthogonal components of vectors, instantaneous centers, equivalent linkages, and effective cranks. Emphasizes graphic solutions and introduces the computer as a tool to enhance these concepts. Analyzes reverted and epicyclic gear trains and cam displacement. *Prereq. GET 1171 and PHY 1191.*

Mechanical Engineering Technology

MET 1301 Mechanics A**4 QH**

Explores forces, moments, couples, statics of particles, and rigid bodies in two- and three-dimensions. Examines external and internal distributed forces, first moments and centroids, and structures such as trusses, frames, and machines. *Prereq. MTH 1193, PHY 1191.*

MET 1302 Mechanics B**4 QH**

Emphasizes friction, second moments, kinematics of particles, rectilinear and curvilinear motion of dynamic particles. Topics include force, mass and acceleration, and work and energy. *Prereq. MET 1301.*

MET 1303 Mechanics C**4 QH**

Studies impulse and momentum of particles. Topics include kinematics and dynamics of rigid bodies: force, mass, and acceleration; dynamics of rigid bodies: work and energy, and impulse and momentum; and introduction to mechanical vibration. *Prereq. MET 1302.*

MET 1314 Stress Analysis A**4 QH**

Investigates axially loaded members, stress and strain, allowable stresses, factor of safety, temperature effects, and indeterminate members. Topics include centric loading of bolted and welded connections, shear and moment in beams, eccentrically loaded connections, and flexural and transverse shearing stresses in beams. *Prereq. MET 1301.*

MET 1315 Stress Analysis B**4 QH**

Discusses beam deflections and reactions by various methods, theorem of three moments and torsional stresses and strains. Topics include pressure vessels, power transmission, eccentric loads on struts, beams, riveted and welded joints, combined and principle stresses, Mohr's circle, and theories of failure. *Prereq. MET 1314.*

MET 1319 Mechanics**4 QH**

Introduces mechanics to nonmechanical majors. Topics include statics of particles and rigid bodies, and kinematics and kinetics of particles and rigid bodies. *Prereq. MTH 1193 and PHY 1191.*

MET 1330 Mechanical Design A**4 QH**

Introduces mechanical design, the design process, design factors, creativity, optimization, human factors, and value engineering. Discusses and develops principles through simple design projects. Topics include principles of design, properties and selection of materials; stress concentrations; strength under combined stresses; theories of failure; and impact, fluctuation, and repeated loads. *Prereq. MET 1315, MET 1380.*

MET 1331 Mechanical Design B**4 QH**

Explores stresses, deformation and design of fasteners, screws, joints, springs, and bearings, lubrication, and journal bearings. Topics include stresses and power transmission of spur, bevel, and worm gear, shaft design, and clutches and brakes. Emphasizes group design projects. *Prereq.* MET 1330.

MET 1340 Thermodynamics A**4 QH**

Introduces general theory of heat and matter, laws of thermodynamics, energy-transformation principles, availability of energy, properties and processes for pure substances and ideal gases. Topics include thermodynamic properties and processes of liquids and vapors, tables and charts, mixtures of fluids, and vapor cycles. *Prereq.* PHY 1192.

MET 1341 Thermodynamics B**4 QH**

Discusses theory and analysis of actual engine types using gas and internal combustion engines, theory of gas and vapor flow through orifices and nozzles, and principles of gas compression. Includes analysis of gas turbine cycles, steam power cycles, con-generation systems, and introduction to air-conditioning and refrigeration systems. *Prereq.* MET 1340.

MET 1342 Refrigeration and Air-Conditioning**4 QH**

Focuses on air-conditioning principles, including psychometrics and heat pumps. Examines calculation of heating and cooling loads in accordance with ASHRAE practices, principles of gas compression, analysis of vapor compression, refrigeration systems, low-temperature refrigeration cycles, and absorption refrigeration systems. *Prereq.* MET 1341.

MET 1343 Heat Transfer**4 QH**

Presents the principles of heat transfer: thermal conductivity and thermal conductance/resistance. Examines heat transfer mechanisms, equations of conduction, and natural and forced convection. Covers emissivity and absorptivity, radiation between simple bodies, heat transfer coefficients, heat changer effectiveness, and heat exchanger design and selection. *Prereq.* MET 1341.

MET 1370 Fluid Mechanics A**4 QH**

Investigates hydrostatics, principles governing fluids at rest, pressure measurement, hydrostatic forces on submerged areas and objects, and simple dams. Topics include fluids in moving vessels, hoop tension fluid flow in pipes under pressure, fluid energy, power, and friction loss, Bernoulli's theorem, and flow measurement. *Prereq.* MET 1302.

MET 1371 Fluid Mechanics B**4 QH**

Explores pipe networks and reservoir systems, flow in open channels, uniform flow, energy, friction loss, minor losses, and velocity distribution. Topics include alternate stages of flow, critical flow, nonuniform flow, and accelerated and retarded flow. *Prereq.* MET 1370.

MET 1380 Materials A**4 QH**

Introduces fundamental metallic structures, general metallurgic information covering polymer, ceramic, composite, and properties, testing, and failure of metals. Topics include alloying and hardening of metals, refinement of metals, equilibrium diagrams, characteristics of engineering metals, and selection of materials for engineering applications.

MET 1390 Measurement and Analysis Laboratory**2 QH**

Offers experiments for the collection and analysis of data by graphical and numerical methods including computer applications, report writing that draws conclusions relative to accuracy, precision, true values, and measured values as they relate to basic mechanical measuring instruments for rotational frequency, specific gravity, pressure, temperature, and time as these parameters are utilized in making mechanical measurements. *Prereq.* GET 1100, MET 1314, MTH 1195, and PHY 1193.

MET 1391 Technology Laboratory A**2 QH**

Presents experiments to determine mechanical properties of materials under tensile, compressive, torsional, direct shear, flexural, impact, fatigue, and creep loading conditions as they are affected by normal and abnormal environmental conditions; also as they are affected by homogeneity, nonhomogeneity, isotropy, and nonisotropy. *Prereq.* MET 1315, MET 1380, MET 1390, or taken concurrently.

MET 1392 Technology Laboratory B**2 QH**

Offers experiments to determine the physical properties of incompressible fluids and to measure the flow rates and velocities utilizing pilot tubes, orifice plates, venturii and weirs flow meters, U-tube differential manometers, and piezometers as the fluid flows through open channels, partially filled conduits, conduits under pressure, pipe networks, turbines and pumps. *Prereq.* MET 1390, MET 1370, or taken concurrently.

MET 1393 Technology Laboratory C**2 QH**

Explores basic thermodynamic relations. Experiments examine the flow of compressible fluids and steam and the energy conversion of a fuel into a working substance and the related heat-transfer mechanisms. Discusses operating characteristics of thermal generators, engines, and compressors. *Prereq.* MET 1390, MET 1341, or taken concurrently.

MET 1394 Technology Laboratory D**2 QH**

Presents experiments to examine the operating characteristics and efficiencies of internal combustion engines, brake horsepower, indicated horsepower, friction horsepower, and mean effective pressure. Topics include fuel consumption, torque, ignition timing, manifold pressure, and compression ratios and internal engines as energy conversion systems, and energy conversion of fuels. *Prereq.* MET 1341, MET 1343, MET 1393, or taken concurrently.

MET 1395 Technology Laboratory E**2 QH**

Offers experiment, analytical, and design projects to examine mechanical engineering concepts. *Prereq.* MET 1342, MET 1343, and MET 1390.

MET 1396 Machine Shop**4 QH**

Introduces the study of machines for metal processing, cutting tools, and fluids, machinability, and automatic machinery.

MET 1414 Mechanical Vibrations**4 QH**

Examines elements of vibrating systems, one degree of freedom (undamped free and forced vibration from Newton's law of motion and energy methods), natural frequencies, and damped free and forced vibration. Topics include design of vibration mounts for mechanical equipment, modeling of vibrational systems, shock testing, and computer applications. Laboratory experiments are included. *Prereq.* MET 1303.

MET 1416 Stress Analysis C**4 QH**

Discusses curved beam, asymmetrical bending of beams, shear-center and shear stresses on thin sections, composite beams; columns energy absorption and resilience, inertial stresses, impact loading, and deflection of beams by energy methods and bolted fastenings, and an introduction of finite element analysis. *Prereq. MET 1315.*

MET 1444 Power Generation**4 QH**

Explores electrical power generation by thermomechanical, electromechanical, nuclear, and hydraulic systems. Analyzes thermodynamic cycles as well as practical deviations from the related ideal processes. Considers accessory and auxiliary equipment use. Studies design, performance, economic factors, and public issues affecting electrical power generation.

MET 1481 Materials B**4 QH**

Focuses on the study of inorganic materials (polymers, glasses, ceramics, cements, composites, wood), and materials having important electrical and magnetic properties. A summary of the

most recent applications for the fabrication and uses of both metals and nonmetals. Structures of metals, imperfections, phase diagrams effect of temperature on structure and properties of metals (annealing, recrystallization, recovery, precipitation, diffusion) strengthening mechanisms, mechanical properties of nonferrous metals. Lab experiments in preparation of samples, selection, polishing, and etching; examination of nonferrous metals, use of the microscope, linear analysis construction of cooling curves, and simple binary-phase diagrams. *Prereq. MET 1380.*

MET 1499 Special Problems in Mechanical Engineering Technology**4 QH**

Theoretical or experimental work under individual faculty supervision. *Prereq. Permission of department chair.*

Nursing

NUR 1102 Introduction to Human Nutrition

4 QH

Explores the fundamental role of nutrition in promoting health. Studies the physiological functions of nutrients, their food sources, and recommended intakes for different age groups. Uses principles from the humanities and sciences in developing nutrition concepts. Introduces the use of different diet-assessment tools to assist individuals in meeting nutrient and energy needs. Encourages students to examine their own food choices and how those choices translate into meeting recommended nutrient and energy needs. Discusses the origins of food habits and the relevance of nutrition counseling and education in nursing practice.

NUR 1106 Introduction to Professional Nursing

2 QH

Focuses on socializing students to the discipline of nursing with an introduction to theory-based practice and the philosophy of caring. Explores the dimensions of the professional role within the context of the student's developing self-awareness of personal and professional goals.

NUR 1107 Nursing Process and Skills

3 QH

Emphasizes the centrality of critical thinking to clinical reasoning. Introduces the nursing process as a problem-solving tool and its application in assessing strategies of communication, gathering data, interpreting evidence, analyzing viewpoints, and forming judgments. Provides scientific principles as the framework for using basic nursing skills in the practice of selected nursing interventions. Includes practicing skills in a clinical laboratory. *Prereq.* NUR 1106 or taken concurrently.

NUR 1108 Nursing Health Assessment

3 QH

Emphasizes dimensions of collecting data relevant to health status. Provides an opportunity for learning to use tools and skills of health assessment. Discusses ethnic, cultural, spiritual, social, psychological, developmental, and gender and physical aspects of health assessment. Explores formulating nursing diagnosis and examining the relationship of the nursing care plan to overall resources of the client. Includes practicing skills in a clinical laboratory. *Prereq.* NUR 1107 or taken concurrently.

NUR 1202 Pathophysiological Concepts for Clinical Nursing

4 QH

Reviews human physiology related to oxygenation, nutrition, elimination, protective mechanisms, neurological functions, endocrine functions, and skin integrity. Explores how the human body uses its adaptive powers to maintain equilibrium and how alterations affect normal processes. Examines disease processes and implications for nursing practice. *Prereq.* BIO 1154 or equivalent.

NUR 1206 Promoting Healthy Childbearing and Childrearing

8 QH

Emphasizes the promotion of health from conception to adolescence. Describes potential and actual health-risk factors and explores risk-reduction strategies within the context of the individual, family, and community. Uses the nursing process to provide the framework for students to assess and intervene therapeutically in promoting healthy childbearing and childrearing. Examines the concepts of human development of individual, family, and community within the context of the role of the professional nurse in promoting healthy childbearing and childrearing. Includes clinical learning experiences in a variety of settings. *Prereq.* NUR 1108.

NUR 1208 Promoting Healthy Adulthood and Aging

8 QH

Emphasizes the promotion of health in adults and includes common health problems of adults at critical life stages from the young adult to the frail, elderly years. Analyzes potential and actual health-risk factors and the discovery of risk-reduction strategies by applying the nursing process to the care of adults living within families and communities. Enables students to use health education and teaching methods in assessing and intervening therapeutically to meet the primary health care needs of adults. Assesses the role of the nurse in partnership with the family and community in disease prevention. Includes clinical learning experiences in a variety of settings. *Prereq.* NUR 1206.

NUR 1282 Wellness

4 QH

Focuses on experiential exploration of the concept of wellness. Examines behaviors and life-style choices that lead to a high level of physical, emotional, and spiritual well-being. Includes issues of assessment of health risk, behavior change, life-style analysis, and the life cycle and stress management through self-analysis. *Open to any undergraduate student.*

NUR 1300 Nursing Common Problems

7 QH

Focuses on specific physiologic alterations in adult health and on corresponding psychosocial adaptations in clients and families. Addresses the client's adaptive behaviors within the context of illness and wellness. Allows students to assess, plan, implement, and evaluate nursing care for selected adult clients. Provides an opportunity to administer nursing care, collaborating with faculty, clients, nurses, and other health-team members. Includes a clinical learning experience in various settings. *Prereq.* NUR 1201 and NUR 1202.

NUR 1304 Independent Study Elective

2 QH

Allows students to pursue a topic more intensely or with a special focus. Enables students to contract with a faculty member whose background, interests, and time allow direction of in-depth study. Requires student and faculty member jointly develop course objectives. *Prereq.* NUR 1201.

NUR 1306 Promoting Health Restoration in Children

10 QH

Focuses on the therapeutic nursing interventions used to restore health to children who are experiencing acute and/or complex health problems. Analyzes complex health issues within the context of the individual, family, and community. Examines altered family patterns of coping within a developmental framework and describes support to meet the unique health needs of the family and child. Addresses the therapeutic role in partnership with the family and resources available within a collaborative and interdisciplinary environment. Discusses ethical and legal dimensions of caring for children and their families. Includes clinical learning experiences in a variety of settings. *Prereq.* NUR 1208.

NUR 1307 Influences on Health and Disease

4 QH

Enables the student to understand the values that underlie health-seeking behavior and providing care. Uses values clarification to appreciate individual rights and responsibilities versus the common good. Examines cultural differences in light of individual and group behavior as well as life span issues and family and group responsibilities. Builds a caring ethic and a sense of professional responsibility on the basis of self-awareness and self-examination.

NUR 1308 Promoting Health Restoration of Adults**10 QH**

Focuses on the therapeutic nursing interventions used to restore health to adults who are experiencing acute and/or complex health problems. Analyzes deviations from health with attention to the implications for the individual, as well as the family, in coping with health problems. Analyzes the client's health care needs and the resources to meet them, in collaboration with the client and health providers. Discusses ethical and legal dimensions of nursing care of adults. Emphasizes discharge planning and teaching. Includes clinical learning experiences in a variety of settings. *Prereq.* NUR 1206, NUR 1208.

NUR 1400 Maternal and Child Nursing**9 QH**

Focuses on maintaining optimal health for childbearing and childrearing families. Examines individuals and families at selected developmental stages. Presents theoretical content that focuses on the client's behavior, both adaptive and ineffective, and nursing interventions. Gives students the opportunity to assist clients in coping with the stress and stimuli that interfere with the adaptation process. Includes clinical learning experiences in a variety of settings. *Prereq.* NUR 1300.

NUR 1404 The Nurse Entrepreneur**4 QH**

Focuses on the role of the nurse as an entrepreneur. Within the general functions of nursing, uses situations involving patient family teaching that provide the framework for introducing students to the essentials of undertaking this function as a business venture. Includes the formation of a nurse entrepreneur's venture action plan to do patient and family teaching. *Open to middle students in nursing.*

NUR 1406 Promoting Healthy Communities**7 QH**

Focuses on developing, implementing, and evaluating therapeutic interventions for the community as the client. Uses the nursing process, within the community context, informed by epidemiological trends, sociocultural characteristics, political and legislative influences, organizational programs, environmental factors, and consumer inputs. Emphasizes the role of the public-health nurse in multiple arenas of practice. Examines epidemiological principles and public-health policies in relation to identified health problems and conditions in a specific community. Enables students to conduct a comprehensive assessment, in partnership with the community, to develop a program to meet an identified community health need. Includes clinical learning experiences in a variety of settings. *Prereq.* NUR 1308.

NUR 1408 Promoting Mental Health Restoration**7 QH**

Focuses on developing, implementing, and evaluating psychotherapeutic interventions for clients with complex mental health problems. Analyzes alterations in psychobiological and psychosocial functioning and coping. Formulates a plan of care within the context of the client as individual, family, group, and community. Emphasizes the therapeutic use of the self as students develop communication and other helping skills in interpersonal relationships with clients. Provides the opportunity to apply theories, principles, and research findings in providing mental health care for clients in various settings. Fosters collaboration with the client and interdisciplinary team. Discusses the political, legal, and ethical issues related to the delivery of mental-health services and the creative role of the nurse. Includes clinical learning experiences in a variety of settings. *Prereq.* NUR 1308.

NUR 1502 Introduction to Research in Nursing**4 QH**

Builds on students' prior exposure to select studies applied to nursing. Discusses and critiques qualitative and quantitative research and the value of each to the practice of nursing and to the health care field. Examines the importance of research in nursing to both practitioner and consumer. *Prereq.* Concurrent SOC 1320 or equivalent.

NUR 1507 Comprehensive Nursing Practicum**6 QH**

Helps students to synthesize nursing knowledge, skills, and experience and facilitate their transition to professional nursing practice and case management of clients with complex health problems. Enables students to demonstrate leadership and collaborative skills in working with other members of the health care team. Examines professional, role, and career issues in weekly seminars. Includes clinical learning experiences in a variety of settings. *Prereq.* Senior standing.

NUR 1508 Managing and Leading in Nursing**6 QH**

Focuses on the knowledge and skills related to the delivery of health services within a nursing management context. Presents theories, concepts, and models, such as managed care, organization and management, authority, delegation, resource allocation, budgeting, leadership and empowerment, change, motivation, environmental safety, quality improvement, collective bargaining, and conflict resolution, to give the student an understanding of the knowledge base for the management role of the baccalaureate nurse. Provides the opportunity to apply principles and practice skills in planning and delegating nursing care using different organizational models and approaches. Discusses the developing creative role for managing and leading in nursing. Includes clinical learning experiences in a variety of settings. *Prereq.* Senior standing.

NUR 1600 International Health Care Practices**4 QH**

Introduces the student to the ways in which people in developing nations take care of their health. Considers the cultural context of health care practices, viewed within the framework of what people believe about themselves and the world around them; the relationship of individual and cultural belief systems; the role religious and spiritual beliefs play in protection, care, and curing; ideas about food and its relationship to health; the concepts of health education in a belief system; and the ethical issues of health care and resource allocation. *Open to any undergraduate student.*

NUR 1601 International Health Care Delivery Systems**4 QH**

Provides students with an opportunity to learn about health care delivery systems in other countries. Introduces the student to a framework from which to study any health care delivery system. Includes an overview of health care delivery from a variety of perspectives. Investigates the divergence between two third world and developed nations' health care delivery systems. Provides an opportunity to study a selected country's health care delivery system in depth. *Open to any undergraduate student.*

NUR 1602 International Health Policy Issues**4 QH**

Presents a critical approach to selected issues in contemporary international health policy. Includes the socioeconomic context in which such policy arises, the endogenous and exogenous factors that shape it, and the strategies that govern its implementation. Examines policies related to a selected issue, such as food and agriculture, in some depth as a model for the conceptual approach to understanding health policy issues. *Open to any undergraduate student.*

NUR 1606 Women's Health Choices and Decisions**4 QH**

Explores personal health and safety concerns specific to women from menarche to mid-life. Helps to empower students take charge of their health by examining personal experiences, their knowledge base, and developing self-awareness. Investigates self-promotion of health; how to be a knowledgeable consumer; when and how to choose a provider; and care options for fertility regulation, infertility, pregnancy, childbirth, and other conditions specific to women. *Open to any undergraduate student.*

Pharmacy and Health Sciences

Athletic Training

ATP 1000 Introduction to Athletic Training 3 QH
Exposes students to the profession. Introduces basic injury prevention and first aid techniques.

ATP 1100 Prevention and Care of Athletic Injuries 3 QH
Examines the principles in prevention, recognition, management, and rehabilitation of athletic injuries. Focuses on physiological and pathological nature of the injury and discusses the course of action for return to competition. *Prereq.* ATP 1000.

ATP 1101 Athletic Training Laboratory 1 QH
Discusses the biomechanical and anatomical principles as well as indications and contraindications of the various wrapping and strapping techniques used for athletic injuries. Presents the indications for use and types of protective devices such as braces and splints. Utilizes lab time for applying and developing skills.

ATP 1110 Fundamentals of Athletic Training 3 QH
Presents the duties and functions of the certified athletic trainer, emphasizing how to prevent and evaluate athletic injuries. Focuses on the athletic trainer's relationship to other allied medical professions.

ATP 1200 Clinical Athletic Training 4 QH
Introduces the student athletic trainer to the clinical experience. Gives an opportunity to practice the various skills essential for evaluating, treating, and rehabilitating athletic injuries. *Prereq.* ATP 1100 and ATP 1101.

ATP 1300 Advanced Athletic Training 1 4 QH
Focuses on the evaluating and predisposing conditions of heat illness, head and neck trauma, and lower extremity athletic injuries. *Prereq.* ATP 1100 and ATP 1200.

ATP 1350 Advanced Athletic Training 2 4 QH
Continues ATP 1300. Focuses on evaluating athletic injuries of the upper extremity, torso, and lower back. Covers how to identify injury and illness of the internal organs. *Prereq.* ATP 1100 and ATP 1300.

ATP 1390 Athletic Training Practicum 1 3 QH
Offers assignments in field settings related to students' areas of study. Gives students the opportunity to observe and perform professional skills under a certified athletic trainer's supervision. *Prereq.* ATP 1100 and ATP 1200.

ATP 1400 Therapeutic Modalities in Athletic Training 4 QH
Presents the physical agents used in athletic training with regard to their physiologic effects. Discusses where in the healing process these agents may be used and their theoretical implications. *Prereq.* ATP 1100 and ATP 1200.

ATP 1490 Athletic Training Practicum 2 3 QH
Same as ATP 1390.

ATP 1500 Therapeutic Reconditioning 4 QH
Covers principles and objectives inherent in rehabilitating athletic injuries. Discusses orthopedic rehabilitation fundamentals, as well as specific conditioning and reconditioning techniques. Exposes the student to the different types of exercise and equipment used in rehabilitation. Provides laboratory experiences in applying rehabilitation programs using equipment. *Prereq.* ATP 1200 and ATP 1300.

ATP 1590 Athletic Training Practicum 3 3 QH
Same as ATP 1390.

ATP 1600 Organization and Administration of Athletic Training Programs 4 QH
Provides students with the knowledge and skills necessary to manage an athletic training facility. Includes topics such as budgeting, facility design, physical examinations, and staffing. *Prereq.* ATP 1100, ATP 1200, and ATP 1300.

ATP 1690 Athletic Training Practicum 4 3 QH
Same as ATP 1390.

ATP 1800 Senior Seminar 4 QH
Discusses current topics pertaining to the fields of athletic training and sports medicine. *Prereq.* Senior standing in the athletic training major.

Cardiopulmonary Sciences

CPS 1111 Cardiopulmonary Sciences Seminar 1 1 QH
Introduces the beginning cardiopulmonary sciences student to the various areas of study within the major. Examines the role of each profession in health care delivery. Field trips give students the opportunity to observe professionals in their specific roles.

CPS 1112 Cardiopulmonary Sciences Seminar 2 1 QH
Continues CPS 1111.

CPS 1113 Cardiopulmonary Sciences Seminar 3 1 QH
Continues CPS 1112.

CPS 1114 Basic Life Support 1 QH
Covers what CPR is, how it works, when CPR should be started, and when it should be stopped. Other topics include basic anatomy and physiology, prudent heart living, signals of heart attack, actions for survival, and medicolegal considerations. Teaches the technical aspects of cardiopulmonary resuscitation and foreign body airway obstruction. Three hours of lectures will be followed by three three-hour demonstration/practice/evaluation laboratory sessions. Students successfully completing written and manikin evaluations will be issued American Heart Association BLS Healthcare Provider cards. *Enrollment is limited and preference will be given to Cardiopulmonary Science majors.*

CPS 1211 Practicum in Respiratory Care 4 QH
Provides clinical experience in hospitals. Focuses on respiratory care for noncritical patients. Emphasizes infection control, medical gas administration, humidification of medical gases, aerosol therapy, chest physiotherapy, deep breathing treatments, and the administration of aerosol medications. *Prereq.* CPS 1320, CPS 1321, and CPS 1301 concurrently.

- CPS 1301 Professional Practice Laboratory 1** 1 QH
Provides practice in basic care skills through laboratory exercises and simulation of patient-care situations. Lab fee. *Prereq.* CPS 1332 concurrently.
- CPS 1302 Professional Practice Laboratory 2** 1 QH
Provides students with hands-on experience in working with respiratory therapy equipment. Sets up simulated patient-management problems in the lab to provide problem-solving experience. Lab fee. *Prereq.* CPS 1301 and CPS 1211 concurrently.
- CPS 1312 Practicum in Respiratory Care** 4 QH
Focuses on treating patients with more complex cardiorespiratory disorders. The second course in a sequence of five directly related to the clinical practice of various modalities of respiratory care. *Prereq.* CPS 1332, CPS 1302, CPS 1433 or concurrently, and CPS 1403.
- CPS 1313 Practicum in Respiratory Care** 6 QH
Provides clinical experience in hospitals. Emphasizes respiratory care for critical patients. Reviews advanced respiratory-care topics such as airway care, mechanical ventilation, and positive end expiratory pressure. *Prereq.* CPS 1433, CPS 1403, CPS 1434 or concurrently, CPS 1404 or concurrently.
- CPS 1320 Cardiopulmonary Physiology** 4 QH
Provides detailed information relating to cardiopulmonary physiology in the normal, diseased, and stressed state. Discusses the mechanics of regulatory control and interaction between the cardiovascular and respiratory systems. *Prereq.* PAH 1202 and PAH 1204 or equivalent.
- CPS 1321 Cardiopulmonary Disease** 4 QH
Introduces clinical diagnostic procedures employed in evaluating cardiopulmonary patients and description of the etiology, pathophysiology, diagnosis, and treatment of major cardiopulmonary diseases. *Prereq.* CPS 1320, PAH 1202 and PAH 1204.
- CPS 1332 Introduction to Respiratory Care** 4 QH
Focuses on the theory and application of medical gas administration and humidity/aerosol therapy. Basic to all other professional respiratory therapy courses. *Prereq.* CPS 1321 and CPS 1301 concurrently.
- CPS 1403 Professional Practice Laboratory 3** 1 QH
Provides students with hands-on experience with respiratory therapy procedures. Sets up simulated patient-management problems in the lab to provide problem-solving experience. Lab fee. *Prereq.* CPS 1302 and CPS 1433 concurrently.
- CPS 1404 Professional Practice Laboratory 4** 1 QH
Provides students with an opportunity to acquire experience in working with respiratory therapy life support equipment. Sets up simulated critical-care problems in the lab to provide problem-solving experience. Lab fee. *Prereq.* CPS 1403 and CPS 1434 concurrently.
- CPS 1408 Research Design** 4 QH
Introduces research methodology and scientific writing. Reviews the literature on topics related to the cardiopulmonary sciences. Emphasizes analyzing data and critiquing written research. *Prereq.* Statistics elective.
- CPS 1414 Clinical Seminar 1** 1 QH
Discusses clinical topics and respiratory-care problems encountered during clinical practice in the hospitals. *Prereq.* CPS 1312 concurrently.
- CPS 1415 Clinical Seminar 2** 1 QH
Discusses clinical topics and critical-care problems encountered during clinical practice in the hospital. *Prereq.* CPS 1313 concurrently.
- CPS 1433 Respiratory Care for the Medical and Surgical Patient** 4 QH
Continues the introduction to respiratory therapy, as the didactic portion of beginning clinical experience on noncritical patients. Focuses on respiratory-care problems following major surgery and those problems related to medical patients. *Prereq.* CPS 1211, CPS 1302 and CPS 1403, CPS 1312 concurrently.
- CPS 1434 Respiratory Care for the Critical Patient** 4 QH
Focuses on respiratory-care problems encountered with patients in intensive care units. The last in a sequence of three directly related to the theory of respiratory therapy procedures; designed as the didactic portion of clinical experience on critical patients. *Prereq.* CPS 1433.
- CPS 1510 Perfusion Technology Practicum 1** 6 QH
Provides perfusion technology students with the opportunity to develop, practice, and master skills required to perform extracorporeal circulation procedures. Also includes, but is not limited to, current methods in autotransfusion, myocardial preservation, and intra-aortic balloon support. *Prereq.* CPS 1570.
- CPS 1515 Perfusion Technology Practicum 2** 6 QH
Continues CPS 1510. *Prereq.* CPS 1514, CPS 1571, and CPS 1572.
- CPS 1516 Advanced Clinical Seminar 1** 1 QH
Complements CPS 1571. Discusses current clinical problems related to life-support systems problems encountered in the hospital. *Prereq.* CPS 1641 concurrently.
- CPS 1517 Advanced Clinical Seminar 2** 1 QH
Complements a professional elective taken concurrently. Discusses current clinical problems and research related to problems encountered in the hospital. *Prereq.* CPS 1571 concurrently and CVT status.
- CPS 1518 Advanced Clinical Seminar 3** 1 QH
Complements CPS 1511. Discusses current clinical problems and emphasizes research related to critical-care problems. *Prereq.* CVT senior status.
- CPS 1570 Fundamentals of Perfusion Technology** 4 QH
Applies biologic, pharmacologic, and physical principles to extracorporeal cardiopulmonary support. Focuses on the basic theory and instrumentation of perfusion technology, emphasizing circuit design and function, oxygenator theory, pump dynamics, blood recovery and autotransfusion procedures, myocardial protection techniques, intraaortic counterpulsation, aseptic techniques, and surgical procedures. Provides an opportunity to work with perfusion equipment and to develop the psychomotor skills necessary to implement perfusion procedures. Lab. *Prereq.* Perfusion Technology students only.

CPS 1571 Advanced Life Support Systems I**4 QH**

Introduces students to selected techniques of advanced life support applied to the critically ill patient. *Prereq.* Senior status in CPS.

CPS 1572 Perfusion Technology**4 QH**

Introduces students specializing in perfusion technology to the theory, principles, and concepts of cardiovascular perfusion. *Prereq.* CPS 1571.

CPS 1576 Neonatal Respiratory Care**4 QH**

Provides students with an understanding of the methods and techniques of respiratory therapy for neonatal patients. Emphasizes mechanical ventilation, newborn care, and the respiratory distress syndrome. *Prereq.* RT senior status.

CPS 1578 Advanced Medical Monitoring**4 QH**

Provides students with an opportunity for an in-depth exposure to the theory and application of physiologic monitoring systems and their use in critical-care settings. *Prereq.* Perfusion Technology students only.

CPS 1611 Kinesiology**4 QH**

Investigates the science of human motion and anatomic and mechanical principles as they relate to an understanding of skillful, efficient, and purposeful human motion. Examines the internal and external forces acting on a human body and their effects. *Prereq.* HSL 1261.

CPS 1612 Exercise Physiology I**4 QH**

Studies the immediate and long-range effects of exercise on the human body, emphasizing the cardiovascular and respiratory systems, muscles, and metabolism. Includes physical fitness, body composition, and selected components of motor performance. Covers assessment techniques and training principles. Introduces indirect open-circuit calorimetry and EKG monitoring. *Prereq.* PAH 1202, PAH 1204, CPS 1320.

CPS 1614 Electrocardiography**4 QH**

Studies basic and intermediate electrocardiography, including cardiac function, lead systems, rate, rhythm, axis, infarction, ischemia, hypertrophy, effects of cardiovascular drugs, and effects of exercise. *Prereq.* CPS 1612.

CPS 1615 Exercise Physiology I**5 QH**

Studies the immediate and long-range effects of exercise on the human body, emphasizing the cardiovascular and respiratory systems, muscles, and metabolism. Includes physical fitness, body composition, and selected components of motor performance. Covers assessment techniques and training principles. Introduces indirect open-circuit calorimetry and EKG monitoring. Includes a laboratory.

CPS 1617 Programming for Cardiovascular Health & Exercise**4 QH**

Focuses on the design, delivery, and evaluation of fitness and wellness programs to individuals and groups in a corporate, commercial, or a clinical setting. *Prereq.* CPS 1612 and HSL 1282.

CPS 1618 Cardiopulmonary Assessment**5 QH**

Provides students with the opportunity to gain knowledge and understanding of physiological principles and concepts related to clinical cardiopulmonary assessment. Integrates lecture topics with practical laboratory experiences in physical examination

techniques, basic pulmonary function assessment, laboratory studies, and graded exercise testing with 12-lead electrocardiography. *Prereq.* Anatomy and Physiology 1 and 2, Cardiopulmonary Physiology, Cardiopulmonary Disease.

CPS 1632 Health Science Education**4 QH**

Studies the systems approach to teaching health science. Covers developing instructional goals based on needs assessments, behavioral learning objectives, instructional strategies, and evaluation instruments. Emphasizes using criterion-referenced measurement strategies to evaluate mastery of clinical skills. *Prereq.* CPS junior status.

CPS 1641 Fundamentals of Cardiac Catheterization**4 QH**

Covers cardiovascular technology and basic concepts such as medical aseptic technique. Introduces concepts related to cardiac output studies, shunt determinations, and electrophysiology. Examines the fundamental principles of intracardiac waveforms and cardiac catheterization. *Formerly* RTH 1641.

CPS 1801 Directed Independent Study I**2 QH**

Offers directed study in a student's major wherein in-depth investigation of a special interest area is undertaken. *Prereq.* CPS 1511 concurrently. *Formerly* RTH 1801.

CPS 1802 Directed Independent Study 2**2 QH**

Offers directed study in a student's major wherein in-depth investigation of a special interest area is undertaken. *Prereq.* CPS 1512 concurrently. *Formerly* RTH 1802.

CPS 1810 Continuation of Clinical**0 QH**

Provides perfusion technology students with the opportunity to clear grades of I (Incomplete) in CPS 1515, Practicum in Perfusion Technology 2. At the end of the six-week period, students will be reevaluated using the criteria developed for CPS 1515, and I grades will be changed to the grades earned at that time. *Formerly* RTH 1810.

CPS 1820 Internship in Cardiovascular Health and Exercise**12 QH**

Provides commercial, corporate, or clinical experience in exercise testing, exercise prescription and leadership, and client education and counseling in a supervised setting. Students must successfully complete 360 hours of internship experience in addition to other written assignments. *Prereq.* Completion of quarter 9 in the cardiovascular health and exercise curriculum. *Formerly* HSL 1800/1801.

CPS 1821 Minor Internship in Cardiovascular Health and Exercise**6 QH**

Provides commercial, corporate, or clinical experience in exercise testing, exercise prescription and leadership, and client education and counseling in a supervised setting for students minoring in cardiovascular health and exercise. Students must successfully complete 200 hours of internship experience in addition to other written assignments. *Prereq.* HSL 1612, HSL 1613, and HSL 1614. *Formerly* HSL 1801.

CPS 1866 Special Problems**4 QH**

Discusses current issues and concepts in cardiovascular health and exercise. Requires an independent research paper. *Prereq.* Junior and senior cardiovascular health and exercise majors. *Formerly* HSL 1866.

Counseling Psychology, Rehabilitation, and Special Education

CRS 1200 Introduction to Special Education 4 QH

Surveys the characteristics and the social, emotional, and educational adjustment of individuals with special needs. Reviews legislation and current trends, with an emphasis on integration and full inclusion of individuals with special needs in regular educational settings and also in the community. Introduces principles of instruction and the development of strategies for the generation of Individualized Education Programs (IEPs).

CRS 1314 Introduction to Counseling 4 QH

Surveys major theoretical approaches to counseling. Provides training and practice in listening skills to aid in the development of facilitative responses. Combines didactic presentations and experiential activities to assist students in understanding and implementing a variety of counseling approaches.

CRS 1315 Introduction to Etiology and Development of Special Needs 4 QH

Presents an overview of the etiology and development of disabling conditions, current issues in these areas, problems associated with drug and substance abuse and other high risk factors, and curriculum strategies for dealing with early childhood, elementary, and middle school children with varying special needs.

CRS 1316 Introduction to Assessment, Program Planning, and Implementation in Special Education 4 QH

Presents the process of assessment, program planning, and implementation for individuals with special needs. Requires students to administer three education assessments, summarize the results in a case report, propose a program of education intervention, and identify methods to facilitate and monitor its implementation.

CRS 1317 Student Teaching and Seminar in Special Education 8 QH

Allows for full-time participation in a University-arranged and supervised school program, emphasizing inclusive settings. Gives the student the opportunity to analyze the teaching of and the learning by students with special needs and to demonstrate, evaluate, and develop teaching skills. *Prereq. Advanced professional sequence with minimum 2.5 QPA both overall and in teaching major.*

CRS 1500 Mental Health 4 QH

Investigates emotional health and well-being as they relate to total health, with emphasis on factors that influence emotional behavior. Includes various approaches to emotional health in school programs and the community.

CRS 1502 Communicable and Degenerative Diseases 4 QH

Focuses on the disease immunity process, with emphasis on prevalent communicable diseases in the United States today and their transmission. Also studies chronic diseases, cardiovascular diseases, cancer, diabetes, and other constitutional and degenerative diseases and disorders that affect the nation's health.

CRS 1503 Human Sexuality and Family Dynamics 4 QH

Examines sexuality from a physical, psychological, social, historical, and cultural perspective. Considers sexual needs and concerns about sexuality at various stages in life, including a variety of approaches to sex education in schools, community, and the family. *Prereq. Middler standing or above.*

CRS 1510 Health Counseling 4 QH

Identifies physical, mental, emotional, and social health problems, remedial procedures, and counseling techniques to aid health educators in dealing more effectively with various health issues. *Prereq. Junior standing or above.*

CRS 1800 Directed Study 4 QH

This experience is provided for the student whose unique academic needs or interests cannot be adequately satisfied in any of the scheduled courses of the department. Directed study requires approval of the supervising faculty member and of the dean's office of the college. Approval forms must be submitted to the dean's office during the quarter prior to registration for the directed study. *Prereq. Permission of instructor.*

Dental Hygiene

DHY courses are open only to Forsyth Dental Hygiene students unless otherwise indicated.

DHY 1100 Oral Anatomy and Histology 3 QH

Introduces the student to the structures of the oral cavity. Includes the embryology and histology of the head and neck structures with primary emphasis on the oral cavity. Studies the formation, eruption patterns, and morphology of the primary and permanent dentitions. *This course is open to non-dental hygiene majors.*

DHY 1101 Dental Hygiene Orientation 1 2 QH

Presents an overview of issues relating to the profession of dental hygiene including historical development with emphasis on the philosophy, responsibilities, and current roles of the dental hygienist as a member of the dental health team. Reviews dental terminology. Covers dental manpower and dental delivery systems.

DHY 1102 Dental Hygiene Orientation 2 2 QH

Continues DHY 1101. Presents an overview of the dental hygiene process of care to include assessment, diagnosis, planning, implementation, and evaluation. Covers infection control, medical/dental terminology, and principles of four-handed dentistry. Includes a laboratory component.

DHY 1104 Dental Procedures 1 3 QH

Introduces the student to the discipline of dentistry. Reviews dental specialties with attention given to the roles and responsibilities of the dental assistant. Places emphasis on exposure control, four-handed dentistry, and use and manipulation of some dental materials. A laboratory component is included. *This course is open to non-dental hygiene majors.*

DHY 1105 Dental Procedures 2 4 QH

Continues DHY 1104. Includes a clinical internship in the Harvard School for Dental Medicine postdoctoral training clinics. Students will have an opportunity to apply skills learned in DHY 1104. *Prereq. DHY 1104. This course is open to non-dental hygiene majors.*

DHY 1204 Head and Neck Anatomy 2 QH

Provides a clinical study of anatomy of the head and neck. Emphasizes deviations from normal anatomy and the diagnosis and management of these deviations as they relate to the patient.

DHY 1209 Periodontology 3 QH

Builds upon oral anatomy and pre-clinical dental hygiene concepts presented in the fall quarter. Discusses the histopathology,

etiology, and clinical features of periodontal infections. Includes current concepts in risk assessment and diagnostics. Emphasizes diagnosis, treatment planning, and clinical management of periodontal patients. Includes a one-hour seminar. *Formerly DHY 1208.*

DHY 1211 Dental Hygiene Theory 1 **2 QH**

Encompasses the fundamentals of the science of dental hygiene. Introduces the basic principles and skills utilized to provide oral health care for the patient.

DHY 1212 Dental Hygiene Theory 2 **2 QH**

Provides the student with information necessary for the dental management and treatment of the medically compromised patient. Discusses the etiology, clinical and oral manifestations, treatment planning, and management considerations for the major medical conditions of concern in dentistry. In addition to assigned readings and lecture information, students will participate in case method projects to facilitate the clinical application of the course material.

DHY 1214 Dental Hygiene Theory 3 **2 QH**

Discusses the dental hygiene management of patients with special developmental/acquired, medical/physical, sensory and/or psychological needs. Includes topic areas of gerodontics disabling/handicapping conditions, major psychiatric diseases, dependency disorders, and the cancer patient. Emphasizes the barriers and access to care, patient management via normalization of care, the use of adaptive aids, preventive techniques, and individualized treatment planning. *Formerly DHY 1314.*

DHY 1220 Radiology 1 **2 QH**

Uses lectures, slides, and laboratory experiences to provide the student with a basic knowledge and understanding of radiation biology and hygiene; radiographic image receptors and the developing process; and the fundamentals of dental radiography including the production and projection of X-rays. Emphasizes radiographic surveys by means of the paralleling, bisecting angle, and extra-oral techniques.

DHY 1221 Radiology 2 **1 QH**

Continues DHY 1220. Students refine their skills in producing diagnostically acceptable radiographs. Emphasizes interpreting films for projection, exposure, processing errors, normal radiographic anatomy, and common diseases/anomalies of the teeth and bone.

DHY 1228 Dental Materials **3 QH**

Studies the basic composition and properties of dental materials utilized in dental hygiene practice. Emphasizes the selection, manipulation, and clinical management of dental materials. Examines the relationship between the oral environment and dental materials. Laboratory sessions are integrated with lectures to provide the student with the opportunity to practice various techniques such as mixing cements, pit and fissure sealants, polishing of amalgam and composite restorations, impression taking, and study models.

DHY 1240 Nutrition **2 QH**

Introduces the science of human nutrition based upon the principles of biochemistry. Reviews the nature and function of the micro- and macronutrients essential for health with specific emphasis on the role diet and nutrition play in the prevention of diseases and the promotion of optimum health and oral wellness.

DHY 1301 Introduction to Oral Health Research **3 QH**

Introduces the currently accepted theories and methods of oral health research. Studies research methods, experimental design, and statistical methods with emphasis on dental epidemiology and clinical research. Reviews current dental research from dental journals to evaluate the methods, design, validity, and relevancy of the research on the professions of dentistry and dental hygiene. Discusses future research and advances in technology to help the student gain a perspective on needed research. Funding sources will also be reviewed.

DHY 1308 Pathology **4 QH**

Emphasizes oral pathology. Covers normal structures of the oral cavity, principles of general pathology, including inflammation, neoplasia and diseases/conditions of the oral cavity and its environs, with clinical features, some histopathology, the course of the disease(s), and treatment. Stresses common developmental disorders, cysts of the jaws and neck, caries, pulpitis, other dental defects, mucous membrane pathology, viral, bacterial and fungal diseases, white lesions, benign and malignant oral diseases, pigmented dental and mucosal lesions, allergies, and oral manifestations of systemic diseases. *Formerly DHY 1206 and DHY 1307, Pathology 1 and 2.*

DHY 1315 Dental Hygiene Theory 5 **2 QH**

Introduces dental specialties through lectures, slides, and case presentations of dental procedures related to individual specialties. Topics presented by guest lecturers include orthodontics, endodontics, oral and maxillofacial surgery, prosthodontics, temporomandibular disorders (TMD), dental implants, maxillofacial prosthetics, pediatric dentistry, and radiovisiography.

DHY 1316 Dental Hygiene Theory 6 **2 QH**

Presents material to assist the dental hygiene student to develop the management skills needed to become an effective and productive member of the dental team. Emphasizes identifying professional goals, developing communication skills, writing resumes, perfecting interviewing techniques, and recognizing employer/employee responsibilities and expectations.

DHY 1317 Dental Hygiene Theory 4 **2 QH**

Presents material that focuses on the preventive services of dental hygiene care. Students will consider the role of the dental hygienist relative to caries control, fluoride recommendations, and dietary counseling. Students will integrate concepts of oral wellness and smoking cessation into client care plans as well as examine the delivery of preventive services to clients. Students will also examine chair-side ergonomics for prevention of occupational injuries to themselves.

DHY 1330 Pharmacology **3 QH**

Places initial emphasis on nomenclature to familiarize the student with the terminology used in pharmacology. Undertakes the study of drugs to acquaint the student with their origin, physical and chemical properties, preparation, modes of administration, and effects upon the body systems. Gives special consideration to those drugs which are of dental value, including antiseptics, antibiotics, pain relieving drugs, and the anesthetics.

DHY 1331 Pain Control **2 QH**

Introduces the dental hygiene student to the recognition and management of pain, fear, and anxiety associated with dental treatment. Lectures will cover basic and current concepts in pain and

anxiety control in dental treatment. *Prereq.* Current certification in cardiopulmonary resuscitation and DHY 1330.

DHY 1361 Public Health 2 QH
Introduces current principles and issues in public health and their relationship to the delivery of oral health care to the public. Investigates and discusses the principles of epidemiology, health care delivery, biostatistics, allied health utilization, and fluoridation. Provides each student with the opportunity to select one issue in public health and explore it by writing a short position paper.

DHY 1362 Community Health 2 QH
Examines the topics related to community oral health. Explores the principles of program planning and basic health education methods and materials. Provides each student with the opportunity to select a population of interest in the community and plan, implement, and evaluate a preventive oral health program according to the needs of that population. This experience may help students to recognize a commitment to the community and to accept the responsibilities of a health care professional.

DHY 1364 Seminar in Legal Issues and Ethics 2 QH
Provides a profile of the dental hygienist within a legal and ethical framework. Examines state practice acts. Students will explore the responsibilities involved in hygienist/patient and employee/employer relationships. Investigates the legal ramifications of a variety of practice settings. Uses case studies and values clarification models to encourage ethical and professional development.

DHY 1401 Oral Health Gerontology 4 QH
Introduces the dental hygiene student to oral health gerontology. Reviews the biological, psychological, and social aspects of aging. Places an emphasis on oral tissues. Discusses in detail dental hygiene treatment planning and evaluation for both institutionalized and community based elderly patients. Examines public policy and financing of oral health care for the aged. *Prereq.* Extra mural experience required.

DHY 1402 Advanced Public Health 4 QH
Studies the current issues surrounding today's public health care delivery system in depth. Places emphasis on health legislation both at the state and federal levels. Issues include access to health care, quality assurance/control, and health care costs and financing. Includes evaluation of possible solutions in terms of appropriateness, effectiveness, and economy and a review of health care delivery systems. Students will utilize the principles of oral epidemiology through surveys of specified area populations to develop a health promotion plan.

DHY 1403 Dental Seminars 4 QH
Reviews the current concepts in dentistry and dental hygiene theory and practice. Discusses the impact of new knowledge on the art and science of dentistry, dental hygiene, and prevention of dental disease. Topics will be determined by current literature and the political and socio-economic climate of the times. Uses integration and sharing of personal experiences and practices relating to dental hygiene to assess and improve student's communication, leadership, decision making, and organizational skills.

DHY 1410 Independent Study 4 QH
Gives students an opportunity to explore in depth a subject relevant to their interests. Provides the opportunity to study a problem, present a proposal, carry out a study or a course of action, and prepare both written and oral presentations of their activities.

DHY 1550 Internship 6 QH
Provides professional field assignment in a setting designed to enhance students in their professional career development. Includes supervision by faculty, conferences with professional staff, and projects. Internship may be spread over more than one academic quarter. A minimum of 180 hours is required.

DHY 1611, DHY 1612 Clinical Dental Hygiene 1 and 2 3 QH each
Provides pre-clinical and laboratory instruction in the techniques utilized for the complete evaluation and prophylaxis of patients including instrumentation, polishing, patient evaluation procedures, oral physiotherapy, prevention of disease transmission, medical emergencies, and treatment planning. Pre-clinical activities are coordinated with DHY 1211 and DHY 1212. Actual delivery of patient care begins in DHY 1612. Students will be responsible for patient recruitment. A weekly seminar in DHY 1612 will be conducted for discussion of medically compromised patient cases and patient management strategies.

DHY 1613 Clinical Dental Hygiene 3 3 QH
Provides dental hygiene and other procedures for both adult and child patients in the Forsyth Clinic. Students will be responsible for patient recruitment. A weekly seminar is included for the discussion of patient cases.

DHY 1614, DHY 1615, DHY 1616 6 QH each
Clinical Dental Hygiene 4, 5, and 6
Provides clinical experience to the dental hygiene student. Students provide preventive, educational, and therapeutic oral health services as delegated by the Commonwealth of Massachusetts at our dental hygiene clinic to children and adults on an appointment basis. Students will be responsible for patient recruitment. In addition to the clinical training at the Forsyth Dental Center dental hygiene clinic, students supplement this training via extramural rotations at area hospitals, community health care centers, and public health care programs. A weekly one-hour seminar relates dental hygiene theory to clinical practice.

Health, Sport, and Leisure Studies

HSL 1100 Beginning Swimming 1 QH
Focuses on basic swimming skills for non-swimmers, with emphasis on personal water safety.

HSL 1101 Intermediate Swimming 1 QH
Focuses on basic and advanced swimming skills, with emphasis on form and efficiency. *Prereq.* HSL 1100 or equivalent.

HSL 1106 Beginning Scuba 2 QH
Focuses on basic skin-diving and scuba-diving skills, with emphasis on safety. *Prereq.* HSL 1101 or equivalent.

HSL 1107 Sailing 1 QH
Focuses on basic skills in sailing.

HSL 1109 Beginning Gymnastics I 1 QH
Introduces, in a coeducational approach, basic skills in floor exercise, vaulting, balance beam, parallel bars, uneven bars, high bar, and rings.

HSL 1114 Badminton 1 QH
Focuses on basic badminton strokes, concepts, rules, strategies, and game play.

HSL 1116 Tennis	1 QH	HSL 1154 Modern Dance 2	1 QH
Focuses on basic tennis strokes, concepts, rules, strategies, and game play.		Continues HSL 1153, with progression to more complex modern dance techniques and combinations. <i>Prereq.</i> HSL 1153 or equivalent.	
HSL 1121 Beginning Self-Defense	1 QH	HSL 1155 Modern Dance 3	1 QH
Surveys the principles and fundamental skills at the beginning and intermediate levels.		Continues HSL 1154, with progression into the expressive and choreographic use of modern dance techniques. <i>Prereq.</i> HSL 1154 or equivalent.	
HSL 1124 Beginning Fencing	1 QH	HSL 1156 Ballet 1	1 QH
Focuses on the fundamental principles and techniques of fencing at the beginner level.		Introduces ballet fundamentals, with emphasis on alignment.	
HSL 1126 Karate 1	1 QH	HSL 1157 Ballet 2	1 QH
Focuses on fundamental techniques of unarmed combat for self-defense using the punches, kicks, and blocks of Tae Kwan Do/Karate.		Continues HSL 1156, with emphasis on developing lyrical style. <i>Prereq.</i> HSL 1156 or equivalent.	
HSL 1127 Karate 2	1 QH	HSL 1159 Jazz Dance 1	1 QH
Continues HSL 1126, with progression to more complex techniques and combinations of punches, kicks, and blocks related to Tae Kwan Do/Karate. <i>Prereq.</i> HSL 1126.		Introduces the fundamentals of jazz dance, with emphasis on alignment.	
HSL 1131 Yoga	1 QH	HSL 1160 Jazz Dance 2	1 QH
Introduces yoga skills and techniques for men and women at the beginning level.		Continues techniques introduced in HSL 1159, with emphasis on developing jazz dance style. <i>Prereq.</i> HSL 1159 or equivalent.	
HSL 1132 Weight Training	1 QH	HSL 1163 Ballroom Dance	1 QH
Introduces the principles and use of resistive exercises: isotonic exercise (weights), isometric exercise, and the appropriateness of each.		Introduces traditional and contemporary partner dancing.	
HSL 1133 Physical Conditioning	1 QH	HSL 1164 Ballroom Dance 2	1 QH
Focuses on assessing one's personal physical fitness level, with emphasis on establishing a personal exercise regimen based on scientific principles of training. Utilizes special sections for different mediums of exercise, such as aerobic dance techniques, running, and circuit training.		Continues HSL 1163 with progression into more complex dance steps, partnering techniques, and amalgamations. Expands upon dances taught in HSL 1163 and introduces additional ballroom dances. <i>Prereq.</i> HSL 1163.	
HSL 1134 Aerobic Exercise and Dance	1 QH	HSL 1167 Beginning Racquetball	1 QH
Focuses on aerobic fitness, with strong emphasis on concepts of exercise safety and conditioning.		Focuses on knowledge and skills appropriate to play racquetball at the beginning level.	
HSL 1138 Beginning Skiing	1 QH	HSL 1173 Beginning Track and Field	1 QH
Focuses on fundamental techniques of downhill skiing. Lab fee.		Focuses on the fundamental skills in the various track and field events.	
HSL 1139 Intermediate Skiing	1 QH	HSL 1180 Health and Physical Education in the Elementary School	4 QH
Focuses on downhill skiing, including intermediate and advanced techniques. Emphasizes skill development. Lab fee. <i>Prereq.</i> HSL 1138.		Focuses on introductory knowledge and skills necessary for teaching health and physical education to elementary school children. Emphasizes the importance of the elementary school years for health promotion and positive health behaviors, motor skill development, the implications of health-related fitness, and activities that maximize participation for children in vigorous activity promoting wellness. <i>Replaces</i> HSL 1151.	
HSL 1140 Basketball	1 QH	HSL 1254 First Aid	2 QH
Focuses on knowledge and skills appropriate for playing basketball at the beginning level.		Focuses on emergency care procedures recommended for home, school, and community, including cardiopulmonary resuscitation (CPR). Emphasizes practices endorsed by the American Red Cross.	
HSL 1142 Volleyball	1 QH	HSL 1259 Secondary School Activities	3 QH
Focuses on knowledge and skills appropriate for playing volleyball at the beginning level.		Studies physical activity appropriate for secondary school students' level of development and interest. Gives students the opportunity to learn about pupils' performance and appropriate teaching techniques through observation and actual experience in off-campus schools and learning centers. Partially satisfies the prepracticum requirements for teacher certification at the grades 5–12 level.	
HSL 1150 Soccer	1 QH		
Focuses on knowledge and skill appropriate to play soccer at the beginning level.			
HSL 1153 Modern Dance 1	1 QH		
Introduces modern dance technique and style.			

- HSL 1261 Anatomy and Physiology I** 4 QH
Focuses on gross anatomy and physiology of the human skeletal, joint, nervous, and muscular systems.
- HSL 1263 Motor Development and Learning** 4 QH
Studies the development of motor skills from early childhood through adolescence. Considers age expectations for perceptual motor behavior. Focuses on how information processing is involved in motor learning and performance. Applies basic research data to learning and executing skill in a variety of sport settings.
- HSL 1266 Physical Conditioning Programming** 2 QH
Focuses on how to design and deliver instruction related to physical conditioning and exercises. *Prereq.* HSL 1132 and HSL 1133.
- HSL 1270 Health and Motor Development in Early Childhood** 4 QH
Focuses on social, cognitive, and physical aspects influencing health and motor development in preschoolers and across the life span. Emphasizes the importance of the early childhood years for health promotion and positive health behaviors. Studies the development of fundamental motor patterns (walking, running, catching, throwing, striking, climbing, etc.) including perceptual-motor implications. Provides an opportunity to work directly with a preschooler in a laboratory setting observing and assessing fundamental motor patterns and health behaviors. *Replaces HSL 1265.*
- HSL 1281 Current Issues in Health** 4 QH
Explores topics of current interest, which may include emotional health, nutrition, fitness, sexuality, drug use, disease, consumer issues, and environmental issues. Emphasizes the needs of the participants.
- HSL 1285 Health Concerns of Youth** 4 QH
Applies health concepts to assist youth in reaching a higher level of wellness through preventive measures. Identifies and deals with significant health concerns as they relate to health professionals, teachers, and adults. Partially satisfies the prepracticum requirements for teacher certification grade levels 5–12.
- HSL 1286 Nutrition** 4 QH
Offers the student the opportunity to learn and evaluate nutrition information both as a consumer and a future educator. Explains the chemical, biological, and physiological bases of nutrition.
- HSL 1325, HSL 1326, HSL 1327** 1 QH each
Dance Rehearsal and Performance 1, 2, 3
Gives students the opportunity to develop skill in performance. Also allows students to choreograph, stage, and perform an original work or perform in the original work of a guest or faculty choreographer. *Prereq.* Permission of instructor.
- HSL 1400 Organizational Behavior** 3 QH
Studies human behavior in groups through lectures, reading, and projects. Concentrates on management skills and employment legislation.
- HSL 1401 Program Planning in Recreation** 4 QH
Examines in-depth the steps in planning recreation programs in concert with practical experience.
- HSL 1403 Concepts of Leisure: Sociopsychological Perspectives** 4 QH
Explores the various sociopsychological perspectives of leisure and the relations of mores, social structure, roles, values, and personality to leisure expression. Investigates other pertinent social and environmental factors that contribute to the phenomenon of leisure.
- HSL 1406 Internship Seminar** 1 QH
Offers preparation for professional field assignment in a leisure-service setting. Focuses on identification and assessment of student career goals, analysis of previous volunteer and/or employment experience, professional involvement, and facilitation of the internship placement process.
- HSL 1408 Research Methods** 4 QH
Studies basic statistics, the use of experimental and quasi-experimental design, sampling, instrumentation, data collection, and analysis as applied in recreation and leisure studies.
- HSL 1409 Research Applications** 4 QH
Examines the use of research methods in selected professional applications ranging from the ongoing research of faculty to student-originated studies.
- HSL 1410 Senior Seminar in Contemporary Issues and Trends in Recreation and Leisure** 4 QH
Examines and discusses contemporary issues and trends in the field of recreation and leisure. Focuses on critical aspects of leisure services: legislation, consumer advocacy, professional development, research, and innovations for the improvement of service delivery.
- HSL 1421 Management of Recreation and Physical Education Programs** 4 QH
Focuses on management procedures of recreation and physical education facilities operations. Emphasizes area and facility design, personnel policies, and problem solving related to administration and management.
- HSL 1422 Program Evaluation in Recreation** 4 QH
Examines comprehensive systems for evaluating program effectiveness as it relates to the consumer of recreation services. Emphasizes developing an evaluation system for an agency of the student's choice. Draws case studies from the public, non-profit, and commercial sectors.
- HSL 1423 Commercial Recreation Marketing** 4 QH
Examines commercial and private sector recreation services. Relates case studies, workshops, and practical problems to managing leisure opportunities for resorts, country clubs, theme parks, tourism, sports clubs, manufacturing and merchandising, and industrial recreation.
- HSL 1426 Budget Analysis** 4 QH
Focuses on the study and use of analytical techniques that can improve budgeting decisions. Considers cost-effectiveness and benefit-cost analysis, efficiency measures, and pricing for solutions to capital and operating-budget problems in the non-profit and commercial recreation sectors.
- HSL 1427 Survey of Recreation Facilities** 3 QH
Studies fundamental management, administration, and construction concepts for a wide variety of facilities such as parks, centers, arenas, camps, and marinas.

HSL 1463 Overview of Physical Disabilities	4 QH	ment an unlimited number of times as an adjunct to any health, sport, and leisure studies course at different times during a given academic year.
Offers a holistic and humanistic approach to people with physical disabilities, including amputations, traumatic conditions, sensory impairments, and neurological, orthopedic, and cardiovascular disorders. Studies rehabilitation procedures and treatment, adjunctive therapies, prosthetics, orthotics, assistive devices, and personal care techniques.		
HSL 1511 Independent Study 1	1 QH	
HSL 1512 Independent Study 2	2 QH	
HSL 1513 Independent Study 3	3 QH	
HSL 1514 Independent Study 4	4 QH	
Provides the student with an opportunity for concentrated planning and research in a topic area of health, sport, or leisure. Requires student to submit outline of proposed study.		
HSL 1516 Drug Use and Abuse	4 QH	
Explores the use and abuse of drugs in our society, including prescription and OTC drugs, alcohol, and tobacco. Examines physiological, psychological, and sociological effects of drugs on humans.		
HSL 1599 Theory of Coaching	4 QH	
Provides students with the opportunity to study and analyze learning principles, leadership skills, sociology, and psychology as applied to coaching teams and individuals. Focuses primarily on athletes of junior and senior high school age.		
HSL 1600 Psychology of Sport	2 QH	
Analyzes the psychological behavioral patterns and deviations of sports participants, including spectators and coaches. Emphasizes emotions, motivation, competition, and learning factors. Discusses current sports highlights. <i>Prereq. Physical education major or permission of instructor.</i>		
HSL 1601 Sociology of Sport	2 QH	
Studies sport as a social institution, including theories explaining its role in society. Considers social stratification, politics, economics, violence, women, race, mass media, and competition.		
HSL 1610 Anatomy and Physiology 2	4 QH	
Examines gross anatomy and physiology of the human cardiovascular, respiratory, digestive, urinary, and endocrine systems. Also covers metabolism, calorimetry, and other applied topics. <i>Prereq. HSL 1261.</i>		
HSL 1615 Critical Teaching Skills	4 QH	
Analyzes direct and indirect, verbal and nonverbal teaching methods for classroom and activity teaching, using techniques such as microteaching, peer teaching, and simulation. Examines techniques for measuring teacher behavior, such as interaction analysis. Requires a lab experience in an education setting. Partially satisfies prepracticum requirements for teacher certification. <i>Prereq. HSL 1258 or HSL 1259; prepracticum experience.</i>		
HSL 1777 Honors Adjunct	1 QH	
To be added to any four-credit course in the department when approved by the Honors Committee of Boston-Bouvé. Once approved, the adjunct information is forwarded to the honors office for dissemination to the honors membership. Allows enroll-		
HSL 1800 Supervised Field Experience 1	6 QH	
Includes supervision, evaluation conferences, and seminars as an integral part of this experience. When combined with another approved field-based course (HSL 1801 or HSL 1803), offers assignment in a field setting related to the student's area of study within the curriculum, including observing and performing professional skills under the guidance of a certified cooperating field professional and college supervisor. Taken by HSL majors not in teacher preparation.		
HSL 1801 Supervised Field Experience 2	6 QH	
Includes supervision, evaluation conferences, and seminars as an integral part of this experience. When combined with another approved field-based course (HSL 1800 or HSL 1802), offers assignment in a field setting related to the student's area of study within the curriculum, including observing and performing professional skills under the guidance of a certified cooperating field professional and college supervisor.		
HSL 1802 Supervised Student Teaching 1	6 QH	
Provides a supervised teaching experience in an approved school in which the student assumes clear instructional responsibilities for at least half of the time and full teaching responsibilities for a substantial period of time under the guidance of a certified cooperating teacher and college supervisor. Must be at the level of the teacher certification sought. Includes supervision, evaluation conferences, and seminars as an integral part of this experience. Taken by students who wish to apply for teacher certification. Allows a minimum of 300 clock hours for teacher certification to be achieved when the student successfully completes this course and HSL 1801 or HSL 1803. These courses should be taken in the same quarter.		
HSL 1803 Supervised Student Teaching 2	6 QH	
Provides a supervised teaching experience in an approved school in which the student assumes clear instructional responsibilities for at least half of the time and full teaching responsibilities for a substantial period of time under the guidance of a certified cooperating teacher and college supervisor. Must be at the level of the teacher certification sought. Includes supervision, evaluation conferences, and seminars as an integral part of this experience. Taken by students who wish to apply for teacher certification. Allows a minimum of 300 clock hours for teacher certification to be achieved when the student successfully completes this course and HSL 1801 or HSL 1802. These courses should be taken in the same quarter.		
HSL 1805 Supervised Student Teaching 3	6 QH	
Extends HSL 1802 and HSL 1803 to accommodate students pursuing certification at two levels and who require the additional student teaching practicum of an additional 150 hours. May also be used by student teachers needing extra involvement to meet certification standards not met during HSL 1802 and HSL 1803.		
HSL 1863 TAC — Special Problems	2 QH	
Presents directed study in analysis and coaching of a sport or activity not offered by the department or in special scheduling situations, for example, field hockey, football, lacrosse, wrestling. <i>Prereq. Permission of instructor.</i>		

Medical Laboratory Science

MLS 1101 Medical Laboratory Science Orientation 1 1 QH
Focuses on the history and development of the medical lab science profession; includes an introduction to medical terminology.

MLS 1102 Medical Laboratory Science Orientation 2 1 QH
Continues discussion of topics introduced in MLS 1101, with the addition of a review of mathematics and metric-unit calculations.

MLS 1103 Laboratory Techniques 2 QH
Covers the principles and theories of basic technical skills needed to work competently in a clinical or research laboratory. Discusses issues concerning laboratory safety, aseptic technique, OSHA regulations, quality control, quality assurance, solution preparation, and method evaluation and applies them in a laboratory component. *Prereq.* CHM 1122.

MLS 1109 Foundations of Clinical Laboratory Science 4 QH
Examines basic lab methods employed in primary care, including urinalysis, gram staining, hematocrit, hemoglobin, sedimentation rate, white cell count, and differential. *Prereq.* Admission to physician assistant program or permission of instructor.

MLS 1112 Renal Physiology and Urinalysis 2 QH
Introduces basic medical laboratory science. Examines principles and theories of renal physiology. Emphasizes techniques for chemical and microscopic detection of normal and abnormal urinary tract constituents. *Prereq.* BIO 1107 and CHM 1111.

MLS 1125 Hematology 4 QH
Examines basic hematology procedures and principles. Emphasizes hematopoiesis, hematologic cell maturation, normal and abnormal cell morphology, basic hemostasis, and coagulation testing. *Prereq.* BIO 1107, CHM 1122. Formerly MLS 1123 and MLS 1124.

MLS 1132 Basic Immunohematology 3 QH
Teaches the principles of immunohematology with specific application to the ABO and Rh blood group system, antibody detection, and crossmatch design. Studies basic blood bank techniques including blood typing and crossmatching. Replaces immunohematology lecture portion of MLS 1131. *Prereq.* BIO 1107, MLS 1171, and MLS 1271.

MLS 1145 Microbiology 4 QH
Introduces the principles and techniques of organism isolation, cultivation, and identification from clinical specimens. Discusses identifying bacteria that are pathogenic for humans according to the isolated organism's clinical specimen. Emphasizes how to collect and transport specimens, what laboratory protocols to use in diagnosis, and procedures for identifying organisms. *Prereq.* BIO 1107, CHM 1122, and MLS 1172. Formerly MLS 1142 and MLS 1144.

MLS 1152 Basic Clinical Chemistry and Instrumentation 4 QH
Covers the principles of clinical chemistry with application to procedures and techniques. In laboratory work, emphasizes the clinical significance and common methods of quantitating selected important analyses. Replaces lecture portion of MLS 1151. *Prereq.* CHM 1122, and MLS 1112 or MLS 1311.

MLS 1172 Basic Immunology 2 QH
Covers the basic concepts of medical immunology, including relationships among disease, immune response, and laboratory procedures. Encompasses the concepts of antigen and antibody structure and relationship, and specific and non-specific host response. Covers common laboratory methods for the detection of antigens and antibodies.

MLS 1212 Urinalysis Lab 1 QH
Laboratory for MLS 1112.

MLS 1225 Hematology Laboratory 1 QH
Laboratory for MLS 1225.

MLS 1232 Basic Immunohematology Lab 1 QH
Laboratory for MLS 1132.

MLS 1245 Hematology Laboratory 1 QH
Laboratory for MLS 1145.

MLS 1252 Basic Clinical Chemistry and Instrumentation Lab 1 QH
Laboratory for MLS 1152.

MLS 1412 MLT Special Topics—Applied Microscopy 2 QH
Offers clinical practicum in applied urinalysis, parasitology, and mycology at an affiliated hospital providing MLT(ASCP)- and CLT(NCA)-level instruction. *Prereq.* Admission to MLT Clinical Program.

MLS 1423 MLT Applied Study in Hematology 2 QH
Offers clinical practicum in hematology and coagulation at an affiliated hospital providing MLT(ASCP)- and CLT(NCA)-level instruction. *Prereq.* Admission to MLT Clinical Program.

MLS 1432 MLT Applied Study in Blood Banking 2 QH
Offers clinical practicum in blood banking at an affiliated hospital providing MLT(ASCP)- and CLT(NCA)-level instruction. *Prereq.* Admission to MLT Clinical Program.

MLS 1442 MLT Applied Study in Clinical Microbiology 2 QH
Offers clinical practicum in microbiology at an affiliated hospital providing MLT(ASCP)- and CLT(NCA)-level instruction. *Prereq.* Admission to MLT Clinical Program.

MLS 1452 MLT Applied Study in Clinical Chemistry 2 QH
Offers clinical practicum in clinical chemistry at an affiliated hospital providing MLT(ASCP)- and CLT(NCA)-level instruction. *Prereq.* Admission to MLT Clinical Program.

MLS 1480 MLT Seminar 1 2 QH
Offers a basic introduction to correlation of laboratory findings in hematology, blood banking, microbiology, and clinical chemistry, with appropriate referrals of lab information in working situation. Examines basic use of quality control. *Prereq.* Admission to MLT Clinical Program.

MLS 1523 Hematology MT Applied Study 4 QH
Offers clinical practicum in applied hematology at an affiliated hospital providing for MT(ASCP)- and CLS(NCA)-level instruction. *Prereq.* Admission to MT Clinical Program.

- MLS 1533 Immunohematology MT Applied Study** 4 QH
Offers clinical practicum in applied immunohematology at an affiliated hospital providing MT(ASCP)- and CLS(NCA)-level instruction. *Prereq. Admission to MT Clinical Program.*
- MLS 1544 Clinical Microbiology MT Applied Study** 7 QH
Offers clinical practicum in applied microbiology at an affiliated hospital providing MT(ASCP)- and CLS(NCA)-level instruction. *Prereq. Admission to MT Clinical Program.*
- MLS 1552 Clinical Chemistry MT Applied Study** 7 QH
Offers clinical practicum in applied clinical chemistry at an affiliated hospital providing MT(ASCP)- and CLS(NCA)-level instruction. *Prereq. Admission to MT Clinical Program.*
- MLS 1573 Clinical Immunology MT Applied Study 1** 1 QH
Offers clinical practicum in applied clinical immunology at an affiliated hospital providing MT (ASCP)- and CLS (NCA)-level instruction. *Prereq. Admission to MT Clinical Program.*
- MLS 1574 Clinical Immunology MT Applied Study 2** 1 QH
Continues MLS 1573.
- MLS 1621 Advanced Hematology 1** 3 QH
Studies physiology of blood cells and bone marrow; reviews physiology of blood hemopoiesis; discusses hematologic results as they relate to normal, anemic, and leukemic conditions. *Prereq. MLS 1124 or permission of instructor.*
- MLS 1623 Special Topics: Hemostasis** 1 QH
Offers advanced studies in hemostasis, emphasizing identifying factors and solving hemostatic problems. *Prereq. MLS 1124 or permission of instructor.*
- MLS 1631 Advanced Immunohematology** 2 QH
Examines blood group systems, antibody identification, and advanced immunohematologic principles and procedures. Presents case studies. *Prereq. MLS 1332 or MLS 1132.*
- MLS 1648 Advanced Clinical Microbiology** 4 QH
Examines host and microbial interactions in disease produced by viruses, rickettsia, chlamydia, mycoplasma, mycobacteria, anaerobic bacteria, and actinomyces. Also covers host and microbial interactions in gastrointestinal, genitourinary, and respiratory tract infections. Discusses disease states, diagnostic procedures, and antimicrobial testing. Combines MLS 1645 and MLS 1646. *Prereq. MLS 1142 and MLS 1143.*
- MLS 1649 Medical Parasitology and Mycology** 3 QH
Discusses the parasites and fungi that are pathogenic to man, including pathogenesis, relevant clinical symptoms, and diagnostic criteria. Emphasizes the laboratory procedure used in their diagnosis and organism characteristics used for identification. *Prereq. BIO 1107 or instructor's permission.*
- MLS 1656 Advanced Clinical Chemistry** 4 QH
Discusses advanced principles of clinical chemistry and some instrumentation, as well as acquisition, management, and application of laboratory data. Studies methods of quantitating clinically significant analytes, including pathophysiology of related disease states. *Formerly MLS 1654 and MLS 1655.*
- MLS 1661 Medical Laboratory Science Education** 2 QH
Surveys current topics in medical lab science education: developing objectives, methods of evaluation and certification, clinical instruction and evaluation, medical lab science curricula, and use of media and other methods of instruction. *Prereq. Completion of clinical program.*
- MLS 1662 Clinimetrics** 2 QH
Covers measuring and improving the quality of all steps in the total testing process. Combines Deming's principles of industrial quality management with traditional practices in clinical laboratory quality assurance programs. Discusses design strategies including ordering tests, selecting methods, monitoring analytic quality, and interpreting and reporting tests. Examines each strategy's effectiveness. *Prereq. Completion of MLS clinical applied study.*
- MLS 1665 Medical Laboratory Management** 2 QH
Surveys factors that relate to effective lab administration: hospital organizational structure, principles of management and supervision, cost accounting, purchasing, inspection guidelines, legal responsibilities, and personnel relations. *Prereq. Completion of clinical program.*
- MLS 1672 Immunopathology** 3 QH
Covers the situations in which the host defense response produces the symptoms of disease. Discusses conditions that result from immunodeficiency. Explains the role of the immune system in transplant rejection. Describes neoplasms of the immune system and discusses laboratory procedures used in the diagnosis and management of these conditions. *Prereq. MLS 1171.*
- MLS 1680 MLS Special Topics** 2 QH
Discusses current topics in the clinical lab. *Prereq. MLS 1111, MLS 1121, MLS 1122, MLS 1131, MLS 1141, and MLS 1151.*
- MLS 1681 MLS Senior Seminar** 2 QH
Reviews current undergraduate medical lab science topics.
- MLS 1890 Undergraduate Research** 2 QH
Examines special problems in lab medicine involving individual research under the direction of a faculty member. *Prereq. Permission of instructor.*
- MLS 1891 MLS Current Concepts** 1 QH
Discusses topics determined by recent advances in medical lab science.

Pharmacy

- PAH 1101 Health Career Seminar** 1 QH
Provides students with the opportunity to determine their career goals in the health professions through activity-oriented classes and discipline-specific career information. Addresses self-assessment, career exploration, decision making, and goal implementation. Allows students to gather information about the five majors within the Bouvé College of Pharmacy and Health Sciences.
- PAH 1135 Professional Dynamics in the Health Care Delivery System** 4 QH
Examines the evolution of the American health care delivery system, with emphasis on current aspects of how health care is delivered, how it is financed, where it is delivered, and who delivers it. Discusses present and future influences in health, including

health promotion, disease prevention, and environmental issues. Considers unique and collective health professional roles and responsibilities, humanistic/behavioral dimensions of health care, professional organizations, and professionalism.

PAH 1202 Anatomy-Physiology 1 **5 QH**

Covers structure and function of cells, tissues, and organs, including the muscular, immune, and nervous systems. Includes survey of human anatomy and physiology using experiments, specimens, and computer simulation. Oriented to students in the health professions. Lab fee. *Prereq.* CHM 1122 or CHM 1102, and BIO 1107.

PAH 1204 Anatomy-Physiology 2 **5 QH**

Covers structure and function of the various life-supportive systems not covered in the first quarter. Includes survey of human anatomy and physiology using experiments, specimens, and computer simulation. Oriented to students in the health professions. Lab fee. *Prereq.* PAH 1202 or permission of instructor.

PAH 1210 Anatomy-Physiology 1 **4 QH**

Offers students the opportunity to take the lecture portion only of PAH 1202. *Prereq.* Permission of instructor.

PAH 1211 Anatomy-Physiology Laboratory 1 **1 QH**

Offers students the opportunity to take the lab portion only of PAH 1202. *Prereq.* Permission of instructor.

PAH 1212 Anatomy-Physiology 2 **4 QH**

Offers students the opportunity to take the lecture portion only of PAH 1204. *Prereq.* Permission of instructor.

PAH 1213 Anatomy-Physiology Laboratory 2 **1 QH**

Offers students the opportunity to take the lab portion only of PAH 1204. *Prereq.* Permission of instructor.

PAH 1280 Biochemistry **5 QH**

Introduces the structures, functions, and metabolism of amino acids, proteins, carbohydrates, lipids, and nucleic acids. Discusses the mechanisms of enzyme reactions, enzyme kinetics, vitamins, biological oxidation reduction reactions, and bioenergetics, as well as various inborn errors of metabolism. *Prereq.* CHM 1268 and CHM 1269.

PAH 1776 Junior/Senior Honors Thesis **4 QH**

Provides students with the opportunity to become involved with faculty on either ongoing research projects or student-initiated scholarly activities. Encourages and assists students in writing, presenting, and publishing their research. Allows students to gain an awareness and some understanding of a discipline or area of study in the allied health professions while developing an appreciation for research methods and the process of scientific inquiry. Requires a junior/senior thesis. *Prereq.* Honors participation.

PAH 1777 Honors Adjunct **1 QH**

Designed to be attached to a predesignated professional course in the student's major and offered at the discretion of the faculty member(s) teaching the course. For further details, contact the honors office (1 NI) or PAH honors advisor. *Prereq.* Honors participation and permission of instructor.

PCL 1305 Pharmacodynamics **3 QH**

Introduces pharmacologic principles, with the pharmacotherapeutics of drug groups and individual drug substances of particu-

lar importance in treatment and diagnosis of disease. *Prereq.* BIO 1120, BIO 1255, CHM 1111, and CHM 1112.

PCL 1306 Pharmacodynamics 1 **2 QH**

Introduces pharmacologic principles, with the individual pharmaceuticals of drug groups and individual pharmaceuticals of particular importance in the diagnosis and treatment of disease. Focuses primarily on the applications of such principles and agents to the nursing profession. *Prereq.* BIO 1120, BIO 1255, CHM 1111, and CHM 1112.

PCL 1307 Pharmacodynamics 2 **2 QH**

Continues the topics introduced in PCL 1306. *Prereq.* PCL 1306.

PCL 1409 Pharmacology for the Respiratory-Care Practitioner **4 QH**

Provides an orientation to pharmacology, including the scope of pharmacology; definitions; drug standards; drug legislation; names, sources, and active constituents; and pharmaceutical preparations of drugs relating to the respiratory-care practitioner.

PCL 1420 Pharmacology/Medicinal Chemistry 2 **6 QH**

Continues discussion of topics introduced in PMC 1419. Presents an interdisciplinary chemical and pharmacological approach to understanding drug action. Deals principally with drugs affecting the peripheral nervous, cardiovascular, and renal systems. *Prereq.* PMC 1419 and middler standing.

PCL 1422 Pharmacology/Medicinal Chemistry 3 **6 QH**

Continues discussion of topics in PCL 1420. Covers the medicinal chemistry and pharmacology of drugs acting on the gastrointestinal, endocrine, reproductive, and hematopoietic systems, along with autacoids, and antineoplastics. *Prereq.* PCL 1420 and junior standing.

PCL 1451 Pharmacology Laboratory **1 QH**

Provides experience in systematically monitoring the qualitative effects of selected drugs. Studies quantitative characteristics of drug dose-response relationships, factors influencing such relationships, and methods of calculating and reporting such data. Lab fee. *Prereq.* PMC 1419 and middler standing.

PCL 1801, PCL 1802, PCL 1803 **4 QH each**
Special Research Project (Pharmacology)

Provides opportunity for directed study or research in pharmacology/toxicology wherein the student may undertake in-depth investigation of an area of specialized interest. Lab fee. *Prereq.* Permission of instructor and program director.

PCT 1240 Pharmaceutical Calculations **4 QH**

Introduces the application of mathematical concepts in pharmacy. Emphasizes systems of measurement and basic arithmetic calculations as they relate to the practice of pharmacy. Also introduces statistical analysis methods required for subsequent courses in pharmaceuticals and for improving problem-solving skills using computers. *Prereq.* CHM 1122, MTH 1108.

PCT 1310 Pharmaceuticals Laboratory 1 **1 QH**

Focuses on the physicochemical principles of pharmaceutical preparations and their relationship to quality control and biopharmaceutics and pharmacokinetics. Lab fee. *Prereq.* PCT 1240, PCT 1340 or concurrent enrollment.

PCT 1320 Pharmaceutics Laboratory 2**2 QH**

Focuses on the application of the fundamental principles and techniques of pharmaceutics to the lab preparation and use of various pharmaceutical products. Lab fee. *Prereq.* PCT 1240, PCT 1310, PCT 1340, PCT 1350 or concurrent enrollment.

PCT 1340 Pharmaceutics 1**5 QH**

Focuses on the study of physiochemical theories and principles and their application to pharmaceutical systems. Covers thermodynamics, ionic equilibria, solubility, complexation, interfacial phenomena, rheology, coarse dispersion, diffusion and membrane transport, and chemical kinetics. *Prereq.* MTH 1108, PHY 1203, CHM 1265, and PCT 1240 or concurrent enrollment.

PCT 1350 Pharmaceutics 2**5 QH**

Focuses on the application of the fundamental principles of physical pharmacy to the formulation of pharmaceutical preparations. Emphasizes pharmaceutical dosage forms, including both industrial formulation and extemporaneous compounding. *Prereq.* PCT 1340 and middler standing.

PCT 1440 Biopharmaceutics/Pharmacokinetics**4 QH**

Acquaints students with biopharmaceutics and basic pharmacokinetics. Discusses dissolution, disintegration, general concept of one- and two-compartment models; linear and nonlinear pharmacokinetics; drug kinetics after intravenous, intramuscular, or oral administration; practical methods of one-compartment model utilizing urinary data; bioavailability; multiple-dosing kinetics; and general approaches to dosage adjustment in disease states. *Prereq.* MTH 1108, PAH 1204, PAH 1280, PCT 1240, PCT 1310, PCT 1320, PCT 1340, PCT 1350, and junior standing.

PCT 1801, PCT 1802, PCT 1803**4 QH each****Pharmaceutics Special Research Project**

Provides opportunity for directed study or research in one of the pharmaceutical sciences, wherein the student may undertake in-depth investigation of an area of specialized interest. Lab fee. *Prereq.* Permission of instructor(s) and program director.

PHP 1301 Pharmaceutical Jurisprudence**4 QH**

Offers a comprehensive analysis and interpretation of laws relating to the practice of pharmacy. Discusses federal and state food and drug laws, narcotics laws, Medicare and Medicaid regulations, and state pharmacy laws. *Prereq.* Junior standing.

PHP 1302 Pharmacy Administration 1**4 QH**

Covers contemporary administrative aspects of pharmacy: trends in contemporary practice, third-party payment plans, macroeconomic impact on the profession, and the impact of current health care issues on pharmacy. *Prereq.* Senior standing or permission of instructor.

PHP 1303 Interpersonal Skills for Health Professionals**4 QH**

Applies the skills of interpersonal communication to situations encountered in various health care settings. Provides students with an opportunity to learn to integrate specific technical competence with serious concern for personal, social, and cultural factors in illness and health care. Through the use of medical sociology literature, audio-visual materials, case analyses, and personal reflection on actual patient encounters, provides the students with an opportunity to improve interpersonal communication skills and to increase their understanding of practitioner patient relationships, patient's needs and responses in illness and treatment, and professional behavior in practice settings.

PHP 1304 Social Pharmacology**4 QH**

Studies drug-taking experiences and behaviors. Provides an overview of theories and research findings that describe the relationships between personal, social, and cultural factors and drug taking, while comparing and contrasting the social approach with the pharmacological paradigm of drug effects and the medical model of drug use. Through readings, audiovisual materials, and descriptions of personal experiences, examines the varieties of drug experiences, patterns of and reasons for drug taking of all types, and strategies for preventing drug-use problems.

PHP 1305 Hospital Pharmacy Management**4 QH**

Examines the factors involved in the operations and management of a hospital pharmacy within the context of the total hospital structure. *Prereq.* Senior standing or permission of instructor.

PHP 1306 Community Pharmacy Management**4 QH**

Focuses on the management requirements for establishing a community pharmacy. Analyzes the prevailing types of organizations, locations, leases, business organization, staffing, plant layout and design, and financial factors. *Prereq.* Senior standing or permission of instructor.

PHP 1401 Drug Information and Evaluation**3 QH**

Introduces the principles and practice of drug information. Covers the levels of practice, the availability of therapeutic reference sources, the use of abstracting and indexing systems, how to respond to drug information questions, and basic statistical data required to help understand the medical and pharmaceutical literature. *Prereq.* Fourth-year standing or permission of instructor.

PHP 1402 Parapharmaceuticals**2 QH**

Focuses on the nature and application of various surgical devices, appliances, bandages, home health care products, and hospital and sickroom supplies in patient care. Also, introduces sterile products.

✓ PHP 1411 Pathophysiology**4 QH**

Focuses on basic concepts of pathophysiology for pharmacy, toxicology, and respiratory therapy majors, emphasizing disease processes and alterations of normal organ functions. *Prereq.* PAH 1202, PAH 1204, and middler standing.

PHP 1441 Therapeutic Drug Monitoring**4 QH**

Covers the monitoring, developing, and modifying of drug dosage regimens and the pharmacokinetic factors influencing the regimen selection for various therapeutic drug categories. *Prereq.* PCT 1440 and junior standing.

PHP 1501 Pharmacy Externship**4 QH**

Involves a 520-hour (13 weeks x 40 hours/week) structured practicum in community pharmacy. Includes applied aspects of community pharmacy management; medication dispensing; and patient-oriented services such as prescription and nonprescription medication, consultation, and patient-profile monitoring. *Prereq.* Satisfactory completion of all professional courses through quarter 9.

PHP 1503 Professional Practice Laboratory**1 QH**

Focuses on compounding and dispensing medications in both institutional and ambulatory pharmacy settings. Emphasizes patient counseling techniques and monitoring appropriateness of

therapy. *Prereq.* Satisfactory completion of all professional courses through quarter 9.

PHP 1505 Hospital Pharmacy Externship 4 QH

Provides students with the learning experience needed to develop competency in the delivery of pharmacy services within a hospital setting. The student will receive information and hands-on experience in all phases of inpatient and outpatient dispensing; monitoring drug utilization; hospital committee activities; utilizing hospital reference material; and hospital managerial skills and procedures. *Prereq.* PHP 1609 and senior standing. Taken at the same time as PHP 1506.

PHP 1506 Clinical Pharmacy Clerkship 8 QH

Involves assignment to a clinical site for five full days per week to observe patient response to medication and to evaluate and advise on all factors that may modify efficacy, safety, and economy of therapy. Offers campus seminar with student presentations on current therapeutic topics. *Prereq.* PHP 1609 and senior standing.

PHP 1601 Nonprescription Medication 4 QH

Provides an overview of the types of over-the-counter medications. Discusses the directions and precautions for proper use of these preparations. *Prereq.* Junior standing.

PHP 1603 Selected Topics in Clinical Pharmacy 1 4 QH

Helps students increase their understanding of selected diseases. Examines pathophysiology and diagnosis of the illness as well as drug therapy and its relation to patient compliance and education. Provides greater depth than existing clinical pharmacy courses. *Prereq.* Permission of instructor.

PHP 1604 Selected Topics in Clinical Pharmacy 2 4 QH

Helps increase the student's knowledge of selected disease entities. Examines pathophysiology and diagnosis of the illness as well as drug therapy and its relation to patient compliance and education. Provides greater depth than existing clinical pharmacy courses. *Prereq.* Permission of instructor.

PHP 1605 Introduction to Sterile Products 4 QH

Introduces pharmacists' role in manufacturing and using sterile products. Covers intravenous incompatibilities, aseptic technique, sterile room equipment, quality control, safe handling of cancer chemotherapeutic agents, and sterile product room systems and design. Discusses a variety of sterile products, including parenteral nutrition, small and large volume parenterals, irrigating solutions, cancer chemotherapeutic agents, and ophthalmic preparations. Emphasizes developing an ability to interact with other health professionals. Offers experience using laboratory equipment to prepare sterile products. *Prereq.* Fourth- or fifth-year pharmacy majors only.

PHP 1607 Cancer Chemotherapeutics 4 QH

Emphasizes the role of chemotherapy in the management of malignant disease. Discusses clinical applications of specific chemotherapeutic agents, with the remainder of the course concentrating on specific disease states. Covers related topics such as pain control in cancer patients, control of nausea and vomiting, principles of cancer research, cancer quackery, and adverse effects of chemotherapy. *Prereq.* Fourth-year pharmacy major or permission of instructor.

PHP 1609 Pharmacotherapeutics 6 QH

Examines the drug treatment of the major pharmacologically managed disease states. Covers selected cardiovascular, respiratory, hepatic, renal, joint, endocrine, psychiatric, and oncologic disorders. *Prereq.* PCL 1420, PCL 1422, PCT 1440, PMC 1419, PMC 1421, and junior standing.

PHP 1612 Special Topics in Pharmacy Administration 2 QH

Discusses in-depth a selected topic in the area of pharmacy administration. Topics include business, professional, and environmental management/administrative aspects of pharmacy practice in all settings. *Prereq.* Junior or senior pharmacy majors only.

PHP 1614 Special Topics in Pharmacy Administration 4 QH

Discusses in-depth a selected topic in pharmacy administration. Topics include business, professional, and environmental management/administrative aspects of pharmacy practice in all settings. *Prereq.* Junior or senior pharmacy majors only.

PHP 1801, PHP 1802, PHP 1803, PHP 1804 4 QH each
Special Research Project

Provides opportunity for directed study or research in clinical pharmacy or pharmacy administration, wherein the student may undertake in-depth investigation of an area of specialized interest. *Prereq.* Permission of instructor.

PHP 1805 Special Research Project 3 QH

Offers directed study or research in pharmacy administration, allowing for the in-depth investigation of an area of special interest. *Prereq.* Permission of instructor.

PHP 1806 Special Research Project 2 QH

Same as PHP 1805.

PMC 1322 Pharmaceutical Biotechnology 3 QH

Introduces the principles of immunology and molecular biology and discusses their applications to the design, development, and use of biopharmaceuticals. Topics include small and large peptides, antibodies, and factors. *Prereq.* PAH 1280, CHM 1269.

PMC 1419 Medicinal Chemistry/Pharmacology 1 5 QH

Introduces the principles of pharmacology and medicinal chemistry. Discusses the major drug classes affecting the central nervous system, including anxiolytics, sedative-hypnotics, anesthetics, anticonvulsants, neuroleptics, antidepressants, and narcotic analgesics. Considers therapeutic indications, mechanisms of action, structure-activity relations, and undesirable actions including drug abuse. *Prereq.* BIO 1107, CHM 1269, PAH 1202, PAH 1204, and middler standing.

PMC 1421 Antiinfectives 5 QH

Presents an integrated approach to the study of antiinfective agents. Emphasizes the biochemical basis for the action mechanism of antibacterial, antifungal, and antiviral agents; the chemistry of representative members of the major classes of antiinfective agents; and the pharmacology, pharmacokinetics, and therapeutic applications of drugs used to treat bacterial, fungal, and viral infections. Discusses the AIDS epidemic with a focus on investigating new drugs and treatment modalities that may be valuable in either preventing HIV replication or in the therapy of opportunistic infections. *Prereq.* BIO 1121, CHM 1269, PAH 1280, PMC 1419, and junior standing.

PMC 1801, PMC 1802, PMC 1803**4 QH each****Special Research Project (Medicinal Chemistry)**

Offers directed study or research in one of the medicinal chemistry areas, wherein students may undertake in-depth investigation of an area of specialized interest. Lab fee. *Prereq.*

Permission of instructor and program director.

Physical Therapy

PTH 1007 Cooperative Education in Physical Therapy**1 QH**

Introduces students to cooperative education and its implications for career planning in physical therapy.

PTH 1114 Introduction to Physical Therapy I**2 QH**

Provides orientation to the field of physical therapy and its role in the health professions. Explores theory and practice in applied body mechanics and basic procedures related to patient management.

PTH 1118 Developmental Base of Human Performance**4 QH**

Studies the growth and development of perceptual-motor skills from birth to old age. Considers age expectations for perceptual-motor behavior, focusing on the processes underlying developmental changes.

PTH 1202 Therapeutic Modalities in Physical Therapy Practice**3 QH**

Provides practice in preparing patients and equipment for various treatment procedures using physical agents. Includes theory, demonstration, and practice in applying heat and cold modalities, hydrotherapy, ultraviolet and laser light therapies, and electrotherapy. *Prereq.* PTH 1114.

PTH 1310 Clinical Gross Anatomy**6 QH**

Covers the structure and function of the human body, with particular emphasis on the skeletal, muscular, nervous, and vascular components of each region. Involves lectures, cadaver dissection, osteology labs, and surface anatomy palpation to investigate basic human anatomy and the clinical applications of anatomy lab. *Prereq.* BIO 1152, BIO 1153, and BIO 1154.

PTH 1316 Neuromuscular Physiology**4 QH**

An in-depth study of neuromuscular physiology, motor control, and motor learning, with applications to physical therapy practice. *Prereq.* BIO 1152, BIO 1153, BIO 1154, and PTH 1202.

PTH 1320 Soft Tissue Mobilization**2 QH**

Offers theory, demonstrations, and practice of manual therapy integrated with other treatment procedures. Also covers anatomical and physiological theory and principles. Uses problem solving and case analyses. *Prereq.* BIO 1254, BIO 1255, and PTH 1202.

PTH 1325 Clinical Medicine I**4 QH**

Covers general medicine, lab medicine, and pathology as related to conditions commonly treated by physical therapists. *Prereq.* BIO 1152, BIO 1153, and BIO 1154.

PTH 1330 Clinical Kinesiology**5 QH**

Studies normal movement through analysis of muscle and joint function. Also gives clinical applications for pathological movement. Includes lab. *Prereq.* PTH 1310 and PTH 1316.

PTH 1335 Musculoskeletal Evaluation**3 QH**

Covers evaluation procedures, including theory, demonstration, practice, and planning. *Prereq.* PTH 1310, PTH 1316, and PTH 1320.

PTH 1341 Musculoskeletal Therapeutic Exercise**5 QH**

Explores the theory, planning, and practice of basic therapeutic exercise. Discusses musculoskeletal as well as basic cardiovascular principles. Offers the opportunity to apply principles from other professional courses to design treatment programs using a systematic, problem-solving approach. *Prereq.* Satisfactory attainment in all prior professional courses.

PTH 1345 Orthopedic Clinical Medicine 2**3 QH**

Focuses on orthopedic conditions and their medical, surgical, and physical therapy treatment. *Prereq.* PTH 1310, PTH 1316, and PTH 1325.

PTH 1352 Psychosocial Aspects of Illness**3 QH**

Examines interpersonal relationships among patients, families, health professionals, and society, with reference to the impact of and reaction to illness. *Prereq.* Satisfactory attainment in all prior professional courses.

PTH 1356 Prosthetics**1 QH**

Studies theory, demonstration, and current practice in prosthetics. *Prereq.* PTH 1316, PTH 1330, PTH 1335, PTH 1341, and PTH 1345.

PTH 1360 Neurological Therapeutic Exercise**4 QH**

Presents theoretical basis and clinical application of integrated approaches to treatment of neurologically impaired clients. *Prereq.* Satisfactory attainment in all prior professional courses.

PTH 1361 Neurological Assessment and Adult Neurology**3 QH**

Focuses on assessing problems of and setting goals for adults with neurological deficits. Covers the etiology, pathology, clinical signs, and medical management of neurological disorders. *Prereq.* Satisfactory attainment in all prior professional courses.

PTH 1366 Neuroanatomy**5 QH**

Examines morphology and function of the human nervous system. Covers abnormalities of structure and function of the nervous system. Includes lecture and lab. *Prereq.* Satisfactory attainment in all prior professional courses.

PTH 1370 Clinical Seminar**2 QH**

Discusses selected topics related to clinical aspects in physical therapy. Considers interpersonal relationships, ethics, teaching-learning process, communication, group dynamics, medical-legal issues, sociocultural/socioeconomic considerations, and clinical education information. *Prereq.* Satisfactory attainment in all prior professional courses.

PTH 1380 Supervised Clinical Education 1**5 QH**

Introduces clinical experience that provides the student with opportunities to practice various skills in the evaluation and treatment of patients under supervision. Requires five weeks during Quarter 9 of the junior year in Massachusetts. *Prereq.* Satisfactory attainment in all prior professional courses.

PTH 1386 Pediatric Neurology**2 QH**

Focuses on the pediatric and neurologic aspects of physical therapy practice. Reviews symptoms, conditions, and

therapeutic/medical intervention. *Prereq.* Satisfactory attainment in all prior professional courses.

PTH 1391 Cardiopulmonary Rehabilitation in Physical Therapy 4 QH
Discusses the role of physical therapy in cardiac and pulmonary rehabilitation. Examines cardio-pulmonary evaluation techniques, etiology, and pathology of common cardiopulmonary disorders and physical therapy management. *Prereq.* *Physical therapy students who have satisfactorily completed all prior professional courses, or respiratory therapy and cardiovascular specialist majors by permission of academic adviser.*

PTH 1392 Pathophysiology and Clinical Therapeutics 1 QH
Covers selected topics in pathophysiology and clinical therapeutics related to current practice in physical therapy. *Prereq.* *Satisfactory attainment in all prior professional courses.*

PTH 1396 Pediatric Evaluation/Treatment 2 QH
Explores evaluating and treating the motor aspects of the neuro-muscularly impaired child. Focuses on analyzing normal movement patterns, recognizing movement dysfunction, and treating movement dysfunction. *Prereq.* *Satisfactory attainment in all prior professional courses.*

PTH 1400 Administration 4 QH
Explores concepts in administration and management applied to physical therapy. Involves seminar and discussion groups. *Prereq.* *PTH 1380.*

PTH 1405 Research for Physical Therapy 4 QH
Covers introduction to research design, basic statistics, analysis of scientific and medical literature, and preparation of an independent research proposal. *Prereq.* *Satisfactory attainment in all prior professional courses.*

PTH 1411 Clinical Integration 4 QH
Incorporates analysis and comparison of methods of physical therapy evaluation and treatment, with an emphasis on therapeutic exercise. Focuses on treatment planning for various problems, with emphasis on rationale and selection of treatment alternatives. Uses case study format and case simulations. *Prereq.* *Satisfactory attainment in all prior professional courses.*

PTH 1415 Supervised Clinical Education 2 0 QH
Provides advanced clinical education by giving the student further opportunities to practice various phases of physical therapy under supervision in preparation for assuming the role of a qualified physical therapist. Involves a six-week assignment. Students may be assigned to clinics located outside of Massachusetts. *Prereq.* *Satisfactory attainment in all prior professional courses.*

PTH 1416 Supervised Clinical Education 3 0 QH
Continues PTH 1415. Provides an additional six-week assignment which gives students the opportunity to further refine their clinical skills under the supervision of a qualified physical therapist. Students may be assigned to clinics located outside of Massachusetts. *Prereq.* *Satisfactory completion of PTH 1415.*

PTH 1420 Physical Therapy in the Health Care System 3 QH
Examines major issues affecting the delivery of health care. Emphasizes the role of the physical therapist as a member of the health team. Involves class discussion and seminar. *Prereq.* *PTH 1370 and PTH 1380.*

PTH 1426 Functional Aspects of Aging 3 QH
Discusses the interaction of psychological, social and physiological factors and their effects on the potential for function of the elderly client. Studies and designs assessment instruments. *Prereq.* *PTH 1370 and PTH 1380.*

PTH 1453 Advanced Musculoskeletal Assessment and Treatment 3 QH
Provides an opportunity to develop knowledge and skills in evaluating and treating joint dysfunction. Uses a problem-solving approach. *Prereq.* *Satisfactory attainment in all prior professional courses.*

PTH 1602 Special Topics in Physical Therapy 2 QH
Offers innovative methods of instruction and deals with areas of special interest.

PTH 1604 Special Topics in Physical Therapy 4 QH
Offers innovative methods of instruction and deals with areas of special interest.

PTH 1777 Honors Adjunct 1 QH
Constitutes an addition to any three, four-, five-, or six-quarter-hour course in the department when approved by the honors committee of the college. Once approved, the adjunct information is forwarded to the honors membership by the honors office. Allows students to enroll an unlimited number of times as an adjunct to any physical therapy course.

PTH 1800 Directed Study 2 QH
Provides experience for the student whose unique academic needs or interests cannot be adequately satisfied in the basic, entry-level curriculum of the Department of Physical Therapy. *Prereq.* *Permission of instructor, chair, and dean.*

Speech-Language Pathology and Audiology

SLA 1101 Introduction to Speech and Hearing 4 QH
Offers an overview of disorders of speech and hearing and their treatment, and a review of normal speech and hearing development. Requires clinical observations of persons with speech, language, and hearing disorders.

SLA 1200 Speech and Hearing Science 4 QH
Presents concepts and information related to the physics of sound and principles of psychophysics and audition. Introduces the anatomical and physiological basis of speech sound production and the acoustic analysis of speech. Examines current theories and research in speech reception, perception, and production.

SLA 1201 Anatomy and Physiology of Vocal Mechanisms 4 QH
Offers an in-depth study of the static structure, musculature, and physiology of the speech mechanism. Emphasizes current research in speech physiology. *Prereq.* *SLA 1101.*

SLA 1300 Language Acquisition 4 QH
Analyzes the emerging semantic and syntactical aspects of language in normal and atypical children. Discusses current theory and research in language acquisition. Requires clinical observations of children with normal and atypical language patterns. *Prereq.* *SLA 1101.*

SLA 1301 Phonetics and Developmental Phonology**4 QH**

Offers basic training in auditory recognition and symbolization of phonemes and allophones in major American dialects. Stresses static and dynamic articulatory descriptions. Also includes a review of the developmental sequence of phonemic acquisition. *Prereq.* SLA 1101 and SLA 1201.

SLA 1303 Introduction to Audiology**4 QH**

Focuses on the basic techniques of audiometric testing and hearing conservation, including a review of basic hearing sciences and a prepracticum and laboratory experience in hearing testing.

SLA 1403 Clinical Procedures in Speech and Language**4 QH**

Reviews principles and procedures of the functional analysis of behavior. Focuses on applying behavioral theory and research to speech, language, and hearing training. Emphasizes clinical investigation in the experimental analysis of behavior, and offers experience applying experimental procedures in assessing and treating people with communication disorders.

SLA 1460 Neurological Bases of Communication**4 QH**

Provides an opportunity to acquire an understanding of neuroanatomy and neurophysiology as they relate to normal aspects of speech, hearing, and language.

SLA 1800 Directed Study**4 QH**

Provides study for the student whose unique academic needs or interests cannot adequately be satisfied in any of the scheduled courses of the department. Requires approval of the supervising faculty member, the chair, and the dean. Also requires that approval forms be submitted to the dean's office during the quarter prior to registration for the directed study. *Prereq.* *Permission of instructor.*

Toxicology

TOX 1100 Toxicology Orientation**1QH**

Introduces toxicology as it relates to regulatory, environmental, forensic, and clinical issues. Focuses on general principles of toxicology and their application to determining the hazards of toxicants in the workplace, the home, and the environment.

TOX 1101 Current Topics in Toxicology**1QH**

Discusses topics of interest to toxicology, pharmacy, biology, chemistry, nursing, and related majors. Selects topics from current research that span regulatory, public health, and environmental issues. Explores other toxicology-related topics.

TOX 1300 Clinical Toxicology**4QH**

Examines the potential toxicity of drugs, commercial products, and environmental agents. Focuses on clinical manifestations, mechanisms of toxicity, principles of treatment, and prevention of acute and chronic poisonings. *Prereq.* PMC 1418.

TOX 1301 Fundamental Principles of Systemic Toxicology**4QH**

Presents the principles of toxicology from an organ-system perspective. Focuses on the basic concepts used to evaluate toxicity, the mode of injury at the organ and cellular levels, and the basic subcellular mechanisms through which toxic agents produce damaging effects. Uses recent toxicological literature to introduce the concepts needed to evaluate toxicity through the analysis of data. *Prereq.* PMC 1418.

TOX 1302 Chemical and Analytical Toxicology**4QH**

Continues TOX 1301. Places additional emphasis on the interpretation of the toxicological literature to evaluate the risk involved from exposure to prototype chemicals. Uses structure activity and biochemical methods of assessment to evaluate the toxicity of major classes of chemical compounds. *Prereq.* PMC 1418 and TOX 1301.

TOX 1322 Biochemical Toxicology Laboratory**4QH**

Introduces the student to investigational methods for assessing toxicity; helps develop the student's ability to analyze and interpret data generated in the lab and in the literature; and helps the student develop technical writing skills. Uses rodents as a model for toxic insult. Examines hepatotoxicity, neurotoxicity, teratogenicity, and other toxic manifestations at the whole-animal, whole-tissue, and biochemical levels. *Prereq.* TOX 1300, TOX 1301, or TOX 1302.

TOX 1811, TOX 1812, TOX 1813 Toxicology Research**4QH each**

Students participate in faculty-directed research projects in the toxicology laboratory.

ROTC, Military Officers' Training Program

AIR 1110 Air Force Today 1 Examines the role of the United States Air Force in the contemporary world. Surveys background, mission, and organization of the Air Force and functions of United States strategic forces. Also emphasizes development of written communicative skills.	1 QH	Discusses organizational and personal values, management of forces in change, organizational power, politics, and managerial strategy and tactics in the context of the military organization. Uses actual Air Force cases to enhance the learning and communication processes.
AIR 1111 Leadership Laboratory 1 Introduces the customs, traditions, and courtesies of the Air Force through guest speakers, seminars, and a field trip to an Air Force base.	1 QH	AIR 1321 Leadership Laboratory 8 1 QH Continues AIR 1311. Emphasizes supervisory and leadership skills. Discusses advantages of an Air Force career.
AIR 1120 Air Force Today 2 1 QH Continues study of the contemporary Air Force by examining general-purpose forces, aerospace support forces, and the total force structure.	1 QH	AIR 1410 United States National Security Forces 1 4 QH Studies the role of the military in maintaining the security of the United States. Examines the international environment, the background of defense policy, strategy, and forms of conflict. Addresses specific issues, including weapons acquisition, arms control, nuclear deterrence, and the national military decision-making process.
AIR 1121 Leadership Laboratory 2 1 QH Continues AIR 1111, with emphasis on the role and responsibilities of an Air Force company grade officer.	1 QH	AIR 1411 Leadership Laboratory 5 1 QH Focuses on exercise of management functions in planning, supervising, and directing cadet group activities. Provides opportunity to acquire proficiency in military leadership skills.
AIR 1210 Development of Air Power 1 QH Traces the historical development of air power and its uses starting before the Wright Brothers and extending through the Korean War. Concentrates on the advent of the air age, the airplane at war (1914-1918), the interwar years, air power in World War II, the Berlin Airlift, air power in the Korean War, and the evolution of air power concepts and doctrine. Emphasizes student participation and presentations to enhance communicative skills.	1 QH	AIR 1420 United States National Security Forces 2 4 QH Studies the military's role as an institution in a democratic society. Includes such topics as civil-military interaction and the military as a profession. Emphasizes developing communicative skills through student presentation.
AIR 1211 Leadership Laboratory 3 1 QH Emphasizes development of techniques used to direct and inform. Assigns students to leadership and management positions in the AIR 1111 programs previously described.	1 QH	AIR 1421 Leadership Laboratory 6 1 QH Continues AIR 1411. Gives students the opportunity to prepare themselves for professional duties.
AIR 1220 Development of Air Power 1 QH Traces the historical development of air power and its uses starting after the Korean War and continuing through its present role in international policies. Students also begin five hours of introductory leadership. Continues emphasis upon student participation and presentations to enhance communicative skills.	1 QH	ARM 1100 Leadership Laboratory 1 0 QH Introduces first-year ROTC students to the basic tenets of discipline and regimentation of the United States Army. Includes the basics of proper wear of military clothing, proper rendering of military courtesies, military customs and traditions, individual and group drill and ceremonies, manual of arms for the M16A1 rifle, and physical fitness training.
AIR 1221 Leadership Laboratory 4 1 QH Continues AIR 1211. Adds a special program in preparation for field training.	1 QH	ARM 1101 Introduction to the Army 1.5 QH Introduces the student to the U.S. Army. Subjects include customs and courtesies of the Army, Army traditions, rank structure and chain of command, wear and appearance of the uniform, branches of the Army, and the role of military power in the world today. Also introduces the Army writing style and physical fitness training.
AIR 1310 Management and Leadership 1 4 QH Examines management and leadership from the point of view of the Air Force junior officer. Covers the individual motivational and behavioral processes, leadership, communication, and group dynamics to provide a foundation for the development of the junior officer's professional skills as an Air Force officer.	4 QH	ARM 1102 Leadership vs. Management Styles 1.5 QH Teaches leadership and management concepts. Illustrates particular management skills: problem analysis and decision-making, planning and organizing, delegation and control, and interpersonal skills. Uses realistic management simulations and structured exercises to teach essential leadership skills.
AIR 1311 Leadership Laboratory 7 1 QH Provides supervisory practice and exercise of leadership functions in controlling and directing activities of the cadet group. Develops leadership potential in a practical, supervised training lab.	1 QH	ARM 1103 Basic Tactics 1.5 QH Examines the mission, organization, and composition of the basic infantry rifle squad and platoon. Includes basic combat formations, movement techniques, unit capabilities, and planning considerations.
AIR 1320 Management and Leadership 2 4 QH Continues AIR 1310 with special emphasis on the basic managerial processes involving decision making, use of analytical aid in planning, organizing, and controlling in a changing environment.	4 QH	

ARM 1200 Leadership Laboratory 2**0 QH**

Presents introduction and hands-on training for second-year ROTC cadets. Includes required basic military skills, including nuclear, biological, and chemical protective training; selected weapons training; use of United States Army communications equipment; land navigation; orienteering, rappelling; and limited military vehicle maintenance training.

ARM 1201 Basic Rifle Marksmanship**1 QH**

Provides instruction and practical application in basic rifle marksmanship techniques, safety, and range operations.

ARM 1202 Comparative Armies**1.5 QH**

Presents an introduction to the roles and organization of the United States Army's Active, Reserve, and National Guard. Uses these concepts as building blocks to examine and compare armies currently affecting United States doctrine and tactics. Integrates the Soviet, Warsaw Pact, NATO, and other world forces into the course structure through the study and examination of current events inside and outside the military establishment.

ARM 1203 Health and Physical Fitness**1.5 QH**

Presents information for the basic Army ROTC cadet on the components and principles of health, exercise, and physical fitness. Addresses basic health issues, emphasizing proper nutrition, weight control, and stress management. Introduces the student to exercise physiology including flexibility and stretching, cardiorespiratory fitness, and resistance and Nautilus equipment. Reviews methods to improve the cadet's individual score on the Army's physical fitness test.

ARM 1300 Leadership Laboratory**0 QH**

Provides advanced leadership applications for the middle-year Army ROTC cadets. Includes the review and hands-on training of all basic military skills learned in the ROTC basic program of instruction. Gives middle cadets increased leadership responsibility within the cadet battalion for further development and evaluation as well as preparation for their junior year Camp All American platoon training.

ARM 1301 Land Navigation**2 QH**

Presents advanced land navigation techniques to junior-year ROTC cadets. Introduces the topographic map and its commonly used symbols. Identifies common terrain features. Topics include measuring directional azimuths as well as straight line and road distance on a map; and converting azimuths, locating unknown points using the intersection, resection, and modified resection techniques. Requires the student to navigate using a map and compass.

ARM 1302 Advanced Tactics and Training**2 QH**

Introduces the fundamentals of offensive and defensive combat at the squad and platoon levels. Includes unit organizations and capabilities, tactical planning, combat orders. Utilizes practical exercises placing the student in leadership roles in simulated tactical environments. Additionally, examines the proper method to conduct briefings, provide training input, and prepare, conduct, and evaluate training. *Prereq. Basic course completion.*

ARM 1303 Advanced Leadership Clinic**2 QH**

Provides classroom, programmed instruction, and practical exercises (for example, land navigation, physical conditioning, weapons familiarization, and leadership) designed to prepare

cadets for maximum individual performance at the six-week ROTC advanced camp. Required for all cadets attending advanced summer camp at Fort Bragg, North Carolina. *Prereq. Basic course completion.*

ARM 1305 Advanced Leadership Laboratory 5**6 QH**

Provides external leadership lab conducted at Fort Bragg, North Carolina, during the summer quarter. As an intensive six-week course, includes application of leadership principles in positions at varying levels of responsibility. Also includes supplemental instruction such as physical conditioning, counseling, senior-subordinate relations, tactical doctrine, international laws of land warfare, and approaches to problem solving. Course attended by students from 123 colleges and universities from Maine to Florida. All expenses borne by the United States government, including a stipend of approximately five hundred dollars.

ARM 1400 Leadership Laboratory 4**0 QH**

Gives fourth-year ROTC cadets practical application of previously learned skills, techniques, education, and experience by assisting ROTC cadre in the conduct of ARM 1100, ARM 1200, and ARM 1300. Gives cadets an opportunity to prepare and present instruction, manage constrained resources, and supervise subordinates. Evaluates cadets based on active-duty Army criteria. Requires attendance by all fourth-year ROTC cadets enrolled in an ROTC course.

ARM 1401 Organization and Communications Skills**2 QH**

Examines the theory, methods, and principles for understanding and motivating human behavior in organizations. Emphasizes the principles and dynamics of leadership. Directs those principles toward the development of leadership styles. Introduces the officer and noncommissioned officer evaluation system. Makes practical applications through the use of case studies and group processes. *Prereq. Basic course completion.*

ARM 1402 Military Law and Ethics**2 QH**

Examines the issues and responsibilities imposed by law on commanders and staff officers in two broad areas: the military criminal justice system and military administrative law. Presents in-depth analysis of the responsibilities and duties of officers and noncommissioned officers operating in the military justice system. Focuses on the legal basis for command and on administrative due process, judicial review of military activities, and other topical issues. Gives students the opportunity to address and develop an understanding of the need for ethical conduct, and an awareness and sensitivity to ethical issues. *Prereq. Basic course completion.*

ARM 1403 Leadership Seminar and Ethics**2 QH**

Provides senior ROTC cadets with need-to-know information that facilitates their entry into active duty. Also provides a forum for the study of personnel, training, logistical, and installation support systems. Discusses personal finances as well as the officer and noncommissioned officer evaluation systems. Gives students the opportunity to address and develop an understanding of the professional ethics of officership, including the need for ethical conduct, and an awareness of and sensitivity to ethical issues. *Prereq. Basic course completion.*

NAV 1100 Naval Science Laboratory**0 QH**

Focuses on either drill instruction or practical work to complement classroom instruction. Must be taken in each class quarter by all NROTC students.

NAV 1101 Introduction to Naval Science
3 QH

Presents a general introduction to the naval profession and the concepts of seapower. Emphasizes the mission, organization, and warfare components of the United States Navy and Marine Corps. Includes an overview of officer and enlisted ranks and rates, training and education, and career patterns. Also covers naval courtesy and customs, military justice, leadership, and nomenclature. Exposes the student to the professional competencies required to become a naval officer.

NAV 1202 Seapower and Maritime Affairs
3 QH

Surveys United States naval history from the American Revolution to the present with emphasis on major developments. Includes an in-depth discussion of the geopolitical theory of Mahan. Also treats present-day concerns in seapower and maritime affairs, including the economic and political issues of merchant marine commerce, the law of the sea, the Russian navy and merchant marine, and a comparison of United States and Soviet naval strengths.

NAV 1401 Leadership and Management 1
3 QH

Studies at an advanced level organizational behavior and management in the context of the naval organization. Includes such topics as the management functions of planning, organizing, and controlling; individual and group behavior in organization; and motivation and leadership. Explores major behavioral theories in detail. Investigates practical applications by the use of experiential exercises, case studies, and lab discussions. Develops other topics, including decision making, communication, responsibility, authority, and accountability.

NAV 1402 Leadership and Management 2
3 QH

Provides a foundation of leadership principles and management tools and skills to prepare and motivate students to confidently assume the responsibilities of a commissioned officer in the United States Navy. Reinforces leadership principles through leadership case studies with emphasis on core values, responsibility, accountability, loyalty, and professional ethics. Provides a basic background in the responsibilities of a junior division officer and watch officer with emphasis on training, counseling, career development, military law, and special programs. This is the capstone course of Naval Science.

Alternative Freshman-Year Program

ECN 4601 Economics I

Examines development of macroeconomic analysis, national income concepts, national income determination fluctuation and growth, role of the banking system and the Federal Reserve System, government expenditures and taxation, international trade, and balance of international payments.

4 QH

ED 4001 Integrated Language Skills Development 1

Strives to improve a student's reading comprehension and related study and language skills. Devotes time, discussion, and considerable practice to meaning skills such as basic reading comprehension and interpretation, including work in critical reading and other interpretational acts (inferences, understanding imagery, and symbolic usage). Focuses on study skills, previewing, finding main ideas and details, outlining and summarizing, continuous interaction, and interaction of all the communications skills—reading, writing, listening, and speaking.

2 QH

ED 4002 Integrated Language Skills Development 2

Continues discussion of topics introduced in ED 4001. *Prereq.* ED 4001.

2 QH

ED 4003 Integrated Language Skills A

Strives to improve a student's reading comprehension and related study and language skills. Devotes time, discussion, and considerable practice to meaning skills such as basic reading comprehension and interpretation, including work in critical reading and other interpretational acts (inferences, understanding imagery, and symbolic usage). Focuses on study skills, previewing, finding main ideas and details, outlining and summarizing, continuous interaction, and interaction of all the communications skills—reading, writing, listening, and speaking.

4 QH

ED 4004 Integrated Language Skills B

Extends ED 4003, with continued emphasis on study skills, including researching, organizing, and writing term papers. Explores critical thinking as it relates to the learning process. Also addresses the choices of academic major and career direction, emphasizing self-assessment and personal decision making. *Prereq.* ED 4003.

4 QH

ENG 4013 Fundamentals of English I

Presents an intensive introduction to the principles of effective expository writing. Emphasizes description, paragraph construction, and organization. Reviews English usage, punctuation, and syntax. Includes essay assignments.

4 QH

ENG 4014 Fundamentals of English 2

Presents intensive instruction in exposition, argument, and academic essay writing and includes instruction in the writing of a research paper. Continues emphasis on English usage, punctuation, and syntax. Includes essay assignments.

4 QH

HST 4110 History of Civilization A

Covers the major ideas and institutions of civilization from ancient times to 1648.

4 QH

HST 4111 History of Civilization B

Continues HST 4110, covering the period since 1648.

4 QH

MGT 4110 Survey of Business and Management

Offers an introduction to the setting and general structure of American business, the characteristics of private enterprise, and the nature and challenge of capitalism and other forms of economic enterprise. Discusses the forms of business, the structure of organization, and the functions of management in the context of their influence on the various forms of business. Through lecture and class discussion, the student gives an overview of the methodologies used in planning, organizing, directing, and controlling the functions of production, marketing, sales, pricing, and finance.

4 QH

MTH 1000 Mathematical Preliminaries 1

Reviews precollege mathematics, primarily arithmetic. Covers operations with numbers, fractions, decimals, percents, and graphs (pictographs, bar graphs, circle graphs, etc.), together with applications of these skills and concepts.

4 QH

MTH 1010 Mathematical Preliminaries 2

Surveys precollege algebra, including signed numbers, exponents, multiplication of polynomials, factoring, linear equations, graphing, and radicals. For students whose background in algebra is weak.

4 QH

MTH 1101 Basic Algebraic Applications

Examines systems of linear equations and their graphs. Focuses on graphic systems of linear inequalities in two variables that apply to linear programming. Introduces matrices, matrix multiplication, and vectors. *Students do not receive credit for MTH 1101 if they have already received credit for MTH 1113.*

4 QH

MTH 1113 College Mathematics for Business

Examines sets, rectangular coordinates and graphs, functions and functional notation, linear and quadratic functions, exponential and logarithmic functions, systems of linear equations, summations, inequalities, permutations and combinations, elementary probability concepts, compound interest, and annuities.

4 QH

POL 4106 Introduction to Politics

Studies the basic political concepts and forces of organization from the classical Greeks to the modern nation-state. Contrasts the Soviet Union and the United Kingdom as contemporary illustrations of the institutional distinction between a totalitarian and a constitutional system.

4 QH

SOC 4010 Principles of Sociology I

Introduces basic concepts and theories relating to the study of humans as participants in group life. Emphasizes socialization, culture, social structure, primary groups, family, social stratification, and population.

4 QH

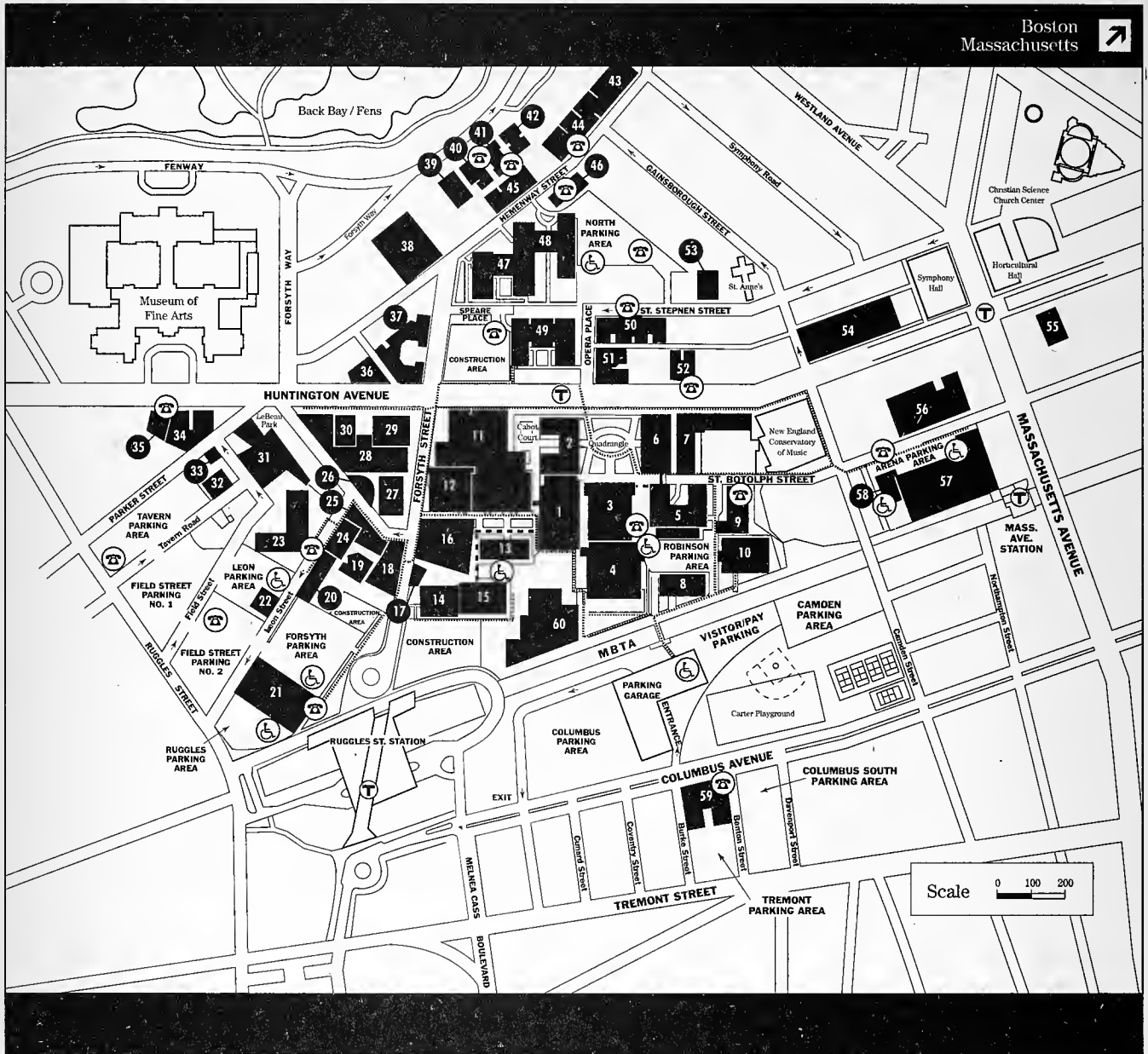
SOC 4011 Principles of Sociology 2

Continues SOC 4010. Emphasizes critical analysis of American society, with attention to problems of social, political, urban, and industrial change.

4 QH

Appendix

Campus Map



Academic and Service Buildings

22	John D. O'Bryant African-American Institute (AF)	7	316 Huntington Avenue (Northeastern at the YMCA) (BY)
12	Barletta Natatorium (BN)	54	Huntington Plaza (271 Huntington Avenue) (HN)
19	Boiler Plant	10	Hurtig Hall (HT)
11	Cabot Physical Education Building (CB) TTY: Rm 110	26	Kariotis Hall (KA)
39	Cahners Hall (CA) TTY: Rm 151	41	Kerr Hall (Faculty Center) (KH)
28	Cargill Hall (CG)	29	Knowles Center (KN)
13	Churchill Hall (CH)	25	Lake Hall (LA) TTY: Rm 203
59	Columbus Place (716 Columbus Avenue) (CP)	57	Matthews Arena (MA)
56	Cotting School (CT)	58	Matthews Arena Annex (MX)
9	Cullinane Hall (CN)	20	Meserve Hall (ME) TTY: Rm 305
40	Cushing Hall (CU)	5	Mugar Life Science Building (Peabody Health Professions Center) (MU)
14	Dana Research Center (DA)	18	Nightingale Hall (NI) TTY: Rm 125
27	Dockser Hall (DK) TTY: Rm 107	31	Porker Building (PA)
6	Dodge Hall (DG)	2	Richards Hall (RI) TTY: Rms 150, 254
3	Ell Student Building (Auditorium) (EL) TTY: Rms 04, 104	8	Robinson Hall (RB)
4	Ell Student Center (Student Lounge) (SC) TTY: Rm 255	21	Ryder Hall (RY) TTY: Rms 170, 180, 251, 270
16	Forsyth Building (FR) TTY: Rms 100, 135	15	Snell Engineering Center (SN) TTY: Rm 120
17	Forsyth Building Annex (FA)	60	Snell Library (SL) TTY: Reference Desk
38	Forsyth Dental Building (FE)	50	122 St. Stephen Street (SS)
1	Hayden Hall (HA) TTY: Rms 120, 202	30	Stearns Center (ST) TTY: Rm 302
33	Hillel-Frager (HF)	32	26 Tavern Road (TA)
24	Holmes Hall (HO) TTY: Rm 276		
55	236 Huntington Avenue (HU)		

Residence Buildings

34	Burstein Hall	45	Loftman Hall and 153 Hemenway Street
43	Kennedy Hall	42	Melvin Hall
46	142-148 Hemenway Street	35	Rubenstein Hall
45	153 Hemenway Street and Loftman Hall	44	Smith Hall
7	316 Huntington Avenue (Northeastern at the YMCA)	49	Speare Hall
52	319 Huntington Avenue	48	Stetson East TTY (public)
51	337 Huntington Avenue	47	Stetson West
36	407 Huntington Avenue	50	106/110/116/122 St. Stephen Street
41	Kerr Hall	23	Willis Hall
53	Light Hall	37	White Hall
		61	400 The Fenway

Key

Academic, residential,
and service buildings

Handicap parking

Accessible routes

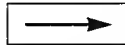
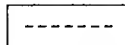
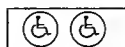
Parking areas

Street direction

Underground tunnel

Emergency telephone

TTY locations
See alphabetic list of buildings
for TTY locations.



Maps are provided by the Information Center, 115 Richards Hall, extension 2736 (TTY extension 3768). Some buildings on this map are used but not owned by Northeastern University.

Academic Calendar 1995–1996

1995

September	4	Monday	Labor Day. University closed.
	5–8	Tuesday–Friday	Summer final examinations for undergraduate day colleges.
	11–15	Monday–Friday	Division A vacation
	12	Tuesday	Fall commencement
	14–19	Thursday–Tuesday	Orientation and registration for freshmen and transfer students.
	18	Monday	Upperclass registration (Division A) 11 AM.
	20	Wednesday	Classes begin in undergraduate day colleges for fall quarter at 8 AM.

October	9	Monday	Columbus Day. University closed.
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November	11	Saturday	Veterans Day. University closed.
	23	Thursday	Thanksgiving Day. University closed.
	23–25	Thursday–Saturday	Thanksgiving recess. University closed except key offices.

December	8–14	Friday–Thursday	Fall final examinations for undergraduate day colleges.
	15–Jan. 1	Friday–Monday	Christmas vacation. University closed except key offices.

1996

January	1	Monday	New Year's Day. University closed.
	2–3	Tuesday–Wednesday	Orientation and registration for new freshmen and transfer students; registration for continuing September freshmen and returning upperclass students (Division B).
	4	Thursday	Classes begin in undergraduate day colleges for winter quarter at 8 AM.
	15	Monday	Martin Luther King, Jr.'s Birthday observed. University closed.

February	19	Monday	Presidents' Day. University operates on a normal class schedule.
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March	11–15	Monday–Friday	Winter final examinations for undergraduate day colleges.
	18–23	Monday–Saturday	Division B vacation.
	25–26	Monday–Tuesday	Orientation and registration for new freshmen and transfer students, continuing September and January freshmen, and returning upperclass students (all seniors and Division A).
	27	Wednesday	Classes begin in undergraduate day colleges for spring quarter at 8 AM.

April	15	Monday	Patriots' Day. University operates on a normal class schedule.
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May	27	Monday	Memorial Day. University closed.
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June	3-7	Monday-Friday	Spring final examinations for undergraduate day colleges. Commencement. Date to be announced.
	10-14	Monday-Friday	Division A vacation.
	17	Monday	Registration for Divisions B and D and January freshmen (Quarter 3).
	18	Tuesday	Classes begin in undergraduate day colleges for summer quarter at 8 AM.
July	4	Thursday	Independence Day. University closed.
August	26-29	Monday-Thursday	Summer final examinations for full-time undergraduate programs.
	30-Sept. 15	Friday-Sunday	Division B vacation.
September	12	Thursday	Fall Commencement.
	12-17	Thursday-Tuesday	Beginning of 1996-1997 academic year. Orientation, advising, and registration continues for new students and returning Division B students.
	18	Wednesday	Classes begin in undergraduate day colleges for fall quarter at 8 AM.

Calendar dates are subject to change. The University community will be notified if such changes are necessary.

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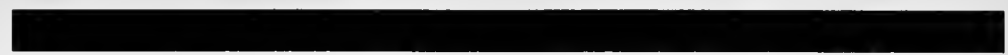
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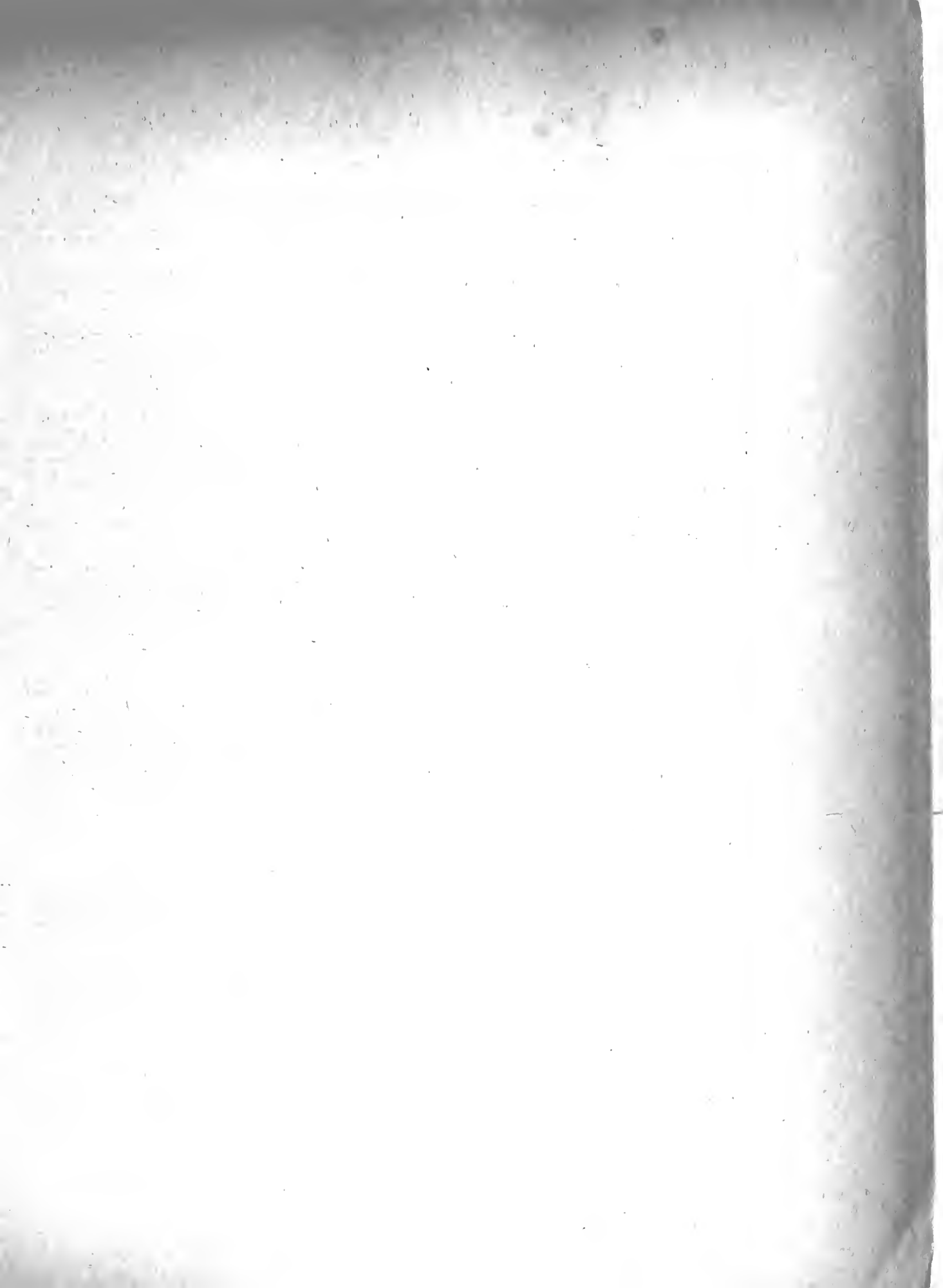
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Boston, Massachusetts 02115
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NORTHEASTERN UNIVERSITY



Undergraduate Catalog



Full-Time Day Programs



1996-1997

Northeastern University

**Undergraduate Catalog
Full-Time Day Programs**

1996–1997

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*Courses in Health, Sport, and Leisure Studies are administered through the Bouvé College of Pharmacy and Health Sciences. Students matriculated for a degree in this area prior to the time of consolidation may, until June 1997, opt to

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The University

Admission

Learning about Northeastern

The Office of Undergraduate Admission encourages prospective students to learn more about Northeastern University. For more information on the following programs, or to receive additional publications, contact the office at 617-373-2200 (voice), 617-373-3100 (TTY), or 617-373-8780 (fax). Or write: Office of Undergraduate Admission, 150 Richards Hall, Northeastern University, Boston, Massachusetts 02115. You may also access our Home Page on the Internet at <http://www.neu.edu>.

Information sessions. Sessions are scheduled at 10:00 AM and 2:00 PM, Monday through Friday, year round (except for legal holidays). They include presentations by an admission counselor, an informal question-and-answer period, and a multimedia presentation. Sessions are also held on Saturday mornings from September through June.

Interviews. All prospective students are encouraged but not required to schedule a personal interview. The interview allows students to meet with an admission counselor and to learn more about the University's academic and cooperative education programs. A sign language interpreter can be arranged, with advance notification.

Guided tours. Student-guided tours of the campus are held Monday through Friday and on Saturday mornings from September through June. During July and August tours are held on Monday through Friday. Tours begin at 9:00 AM and leave on the hour, with the final tour at 3:00 PM. No appointments are necessary for either the information sessions or tours. Prospective students needing an accessible route of travel, a sign language interpreter, or other accommodations should inform the Office of Undergraduate Admission in advance of arrival.

College visit program. Prospective students and their parents have the opportunity to visit any one of the undergraduate colleges and schools through the college visit program. Visits are scheduled so that prospective students and their parents may participate in the information session and university tour on the same day.

Open houses. During the fall, late winter, and early spring, each of Northeastern's undergraduate colleges invites prospective students and their parents to an open house. Representatives of various University departments provide information about admission, cooperative education, student financial services, residential life, student activities, and the University libraries, among other areas.

Northeastern University admits qualified freshmen and transfer students to all programs in September and January. In most programs, transfer students also may apply for entrance at the beginning of the March and June quarters.

Rolling admission. Decisions on admission are made as soon as all required credentials (including first marking-period senior grades and SAT or ACT test scores) have been submitted and reviewed. In all cases of acceptance, candidates must complete their senior year of high school and submit final transcripts as proof of graduation. Admission is selective and priority is given to candidates who apply by March 1.

Early admission—juniors, second-semester seniors. In certain cases, students may enroll at Northeastern before graduating from high school. Such students may enroll in either September or January, thereby reducing by one year the time to complete degree requirements. The endorsement of the student's school principal or guidance counselor is required for early admission.

Deferred admission. Accepted students who wish to participate in the deferred admission plan will be asked to describe the activities they plan for the year preceding enrollment. Students may choose this plan for reasons such as travel, health problems, or work. Students granted deferred admission will be required to place a \$200 tuition deposit to secure their position.

Required deposits. Students who are accepted to the University are asked to submit a nonrefundable tuition deposit of \$200 by May 1. This deposit indicates intent to enroll and is applied to the first-quarter tuition account. Students applying for entrance dates other than September should note the required deposit date on their letter of acceptance. For additional information about deposits required for international students, refer to the International Students section on page 4.

Students requesting on-campus housing must submit a nonrefundable \$400 deposit (in addition to the \$200 tuition deposit) along with a completed housing application. Information about this required nonrefundable deposit is mailed by the Department of Residential Life to all admitted students.

Admission Policies

Entrance Requirements

Ideally, applicants have completed an academically challenging secondary school program—one that includes courses in English, mathematics, laboratory science, history, and a foreign language. Candidates should also have read broadly outside of class and developed an ability to communicate ideas effectively. Achievement in secondary school is the best single predictor of academic success in college. This factor, together with recommendations from the student's school counselor, and Scholastic Assessment Test (SAT) or American College Testing Program (ACT) test results, weighs most heavily in the evaluation process.

Secondary School Preparation

Arts, humanities, and social sciences. Students who plan to major in art, theatre, English, foreign languages, music, philosophy, and speech communication should have demonstrated ability in these areas during high school. Candidates who plan to pursue careers in anthropology, economics, history, human services, linguistics, political science, psychology, or sociology should have a well-rounded background in the social sciences. Applicants to the School of Journalism should have worked on writing and producing high school publications or audio- or videotape productions.

Students seeking certification as teachers in early childhood education or elementary education or those planning to major in human services should have demonstrated interest in the behavioral, social, and human sciences.

Business administration. Candidates must have completed a strong preparatory program that emphasized the humanities, social sciences, and natural sciences. Applicants also must have had several years of mathematics, including geometry and Algebra 1 and 2.

Computer science, engineering, mathematics, nursing, pharmacy and health sciences, and sciences. Applicants are encouraged to complete a full sequence of science and mathematics courses. In science, such a sequence usually includes a year of study and laboratory work in biology, chemistry, and physics; and, in mathematics, the sequence includes geometry, Algebra 1 and 2, and a fourth year of trigonometry and/or analysis. Math and science majors also need courses in the social sciences and humanities.

Criminal justice. Applicants should have demonstrated the ability to succeed in their study of the behavioral, social, and human sciences.

Engineering technology. Applicants are encouraged to complete a full sequence of mathematics, including geometry, Algebra 1 and 2, and analysis; and a full year of study and lab work in a natural science. Candidates also need courses in the social sciences and humanities.

Entrance Examinations

Freshmen must take the Scholastic Assessment Test (SAT) of the College Board or the American College Testing Program (ACT). Results of these tests may be sent directly to the admission office. The College Board code number for Northeastern University is 3667. When evaluating candidates' SAT scores, the admission office will combine the best verbal and math components, regardless of test date. For more information, consult a school guidance counselor or write directly to The College Board, P.O. Box 592, Princeton, NJ 08540 or P.O. Box 1025, Berkeley, CA 94701. Or write to American College Testing Program, P.O. Box 168, Iowa City, IA 52243.

English-as-a-Second-Language Proficiency Requirement

Before being considered for admission, students whose native language is not English are required to demonstrate English language proficiency. This can be done by submitting the results of the College Board's Test of English as a Foreign Language (TOEFL), by successfully completing an approved English-as-a-second-language course of study, or by receiving B- or above in English courses in English-speaking high schools.

Before they are allowed to enroll in academic coursework, all students whose first language is not English and who score below 550 on the TOEFL (or its equivalent on another examination) must take the English Proficiency Test administered by the University's English Language Center. The results of this test are used to assign students to appropriate English courses.

Advanced Placement

The University grants advanced placement credit to applicants with a score of 3 or better in their advanced placement examinations. Applicants may take the tests in art (history, studio—general, studio—drawing), biology, chemistry, computer science (A, AB), economics (microeconomics, macroeconomics), English (language, literature), French (language, literature), German (language), government and politics (comparative, United States), history (European, United States), Latin (Virgil, Catullus—Horace), mathematics (calculus AB, BC), music (theory), physics (BC mechanics—C electricity, magnetism), and Spanish (language, literature). Applicants who wish to submit scores for advanced placement are required to take the Advanced Placement Tests of the College Board in May.

College-Level Examination Program

The University cooperates with the College Board in its College-Level Examination Program. CLEP provides a national program to evaluate nontraditional college-level education. Northeastern will grant college credit to qualified students according to their CLEP scores. Northeastern is a designated CLEP Testing Center. For more information, contact the Counseling Center at 302 Ell Student Center, 617-373-2142.

Health Requirements

The Lane Health Center's Pre-entrance Physical Examination Form is sent to each student following acceptance to Northeastern. Completion of this form is considered a condition of enrollment. Each student must return the completed form, which includes a medical history, documentation of a recent physical exam, and a tuberculin test, within six months of registration.

State law requires medical documentation of appropriate immunization against measles (two vaccinations), mumps, rubella, tetanus, and diphtheria. Both a rubella and a varicella titre are mandatory for the health professions (medical laboratory science, nursing, pharmacy and health sciences, radiology, and physical therapy). Tuberculin tests are required annually for nursing students and within three months prior to the practicum for student teachers. A positive titre for Hepatitis B is required prior to beginning any clinical assignments, internships, or cooperative education quarters for all undergraduate students deemed at risk by their departments and in pharmacy and health sciences and nursing.

In accordance with Section 504 of the Rehabilitation Act of 1973, applications for admission are judged on the basis of qualification, not on the absence or presence of a medical or disabling condition. Any adjustments needed for such applicants are made to ensure access to college life, both academic and extracurricular.

How to Apply

All Students

The application process for all students follows. Refer to the International Students section and the Transfer Students section for additional requirements.

- Complete and sign the application form.
- Enclose the nonrefundable \$40 application fee. Make checks payable to Northeastern University. This fee may be waived in cases of extreme hardship as endorsed by the candidate's secondary school counselor or social worker.
- Mail the application form and the check to the Office of Undergraduate Admission, 150 Richards Hall, Northeastern University, Boston, Massachusetts 02115.
- Arrange for transcripts and required test scores—Scholastic Assessment Test (SAT) or American College Testing Program (ACT)—to be sent to the University. Transfer students who have completed 45 credit hours are not required to submit test scores.
- For priority consideration, applications should be submitted by March 1.
- All materials submitted in conjunction with a student's application become the property of Northeastern University.

International Students

The University welcomes qualified students from other countries. At present, nearly 2,500 international students from more than 115 countries attend Northeastern. The University is authorized under federal law to enroll nonimmigrant aliens as full-time students in degree-granting programs. The University also welcomes non-matriculated students who wish to improve their English skills by studying at the English Language Center for one or more quarters. The English Language Center also offers counseling and assistance to international students who decide to apply to Northeastern. Admission is contingent upon meeting all University requirements.

In addition to the application process described above, international students must complete the following.

- Submit the Supplementary Form with the application.
- Submit the Declaration and Certification of Finances Form with the application.
- Submit the same credentials as U.S. citizens. All credentials must be official documents or certified true copies. Credentials in languages other than English must be accompanied by certified literal English translations. Applicants with previous university-level studies should submit official course descriptions or syllabi for all coursework completed.
- Request the testing agency to submit the official results of the Test of English as a Foreign Language (TOEFL). If these scores are not available at the time of application, it is the responsibility of the international applicant to take the test at the first available opportunity and have the results submitted as soon as possible. An application is considered incomplete until this credential is received. A student who attends and successfully completes the course of study offered by Northeastern University English Language Center (ELC) and obtains a "Pass" or a "Release" from the ELC is not required to submit TOEFL scores.
- Request the testing agency to submit the official results of the Scholastic Assessment Test (SAT). If these scores are not available at the time of application, it is the responsibility of the international applicant to take the test at the first available opportunity and have the results submitted as soon as possible. An application is considered incomplete until this credential is received. An applicant who has successfully completed 45 credit hours is not required to submit SAT scores.
- After acceptance, submit the required nonrefundable tuition deposit of \$200. Upon receipt of the tuition deposit, a Certificate of Eligibility (I-20 form or IAP-66 form) will be issued.
- If students are transferring to Northeastern from another college or university in the United States, one of the following is required. Students returning home before entering Northeastern must re-enter the United States on the I-20 or IAP-66 issued by the University. Students not returning home must present the Northeastern-issued I-20 or IAP-66 to the International Students Office during registration and orientation.

The University considers awarding advanced standing credit to students whose secondary-school education exceeds the requirements met by students in the American educational system. The University recognizes the advanced level of academic preparation offered by the International Baccalaureate. Up to one year of credit is generally granted for scores of 5, 6, or 7 on higher-level examinations, as applicable to the degree being pursued.

Transfer Students

Students who have completed one or two years of study in an accredited college, university, or technical institute or have earned an associate's degree from an accredited junior college or other two-year program may seek admission as an upperclass student.

Basic requirements. Transfer applicants must have achieved a satisfactory college record—appropriate to the course of study they wish to pursue—at another institution. Credit is generally granted toward a Northeastern degree for a grade of C (2.0) or better in any reasonably equivalent course completed at another accredited institution. Candidates must be in good standing and must be eligible to continue in the institution they are currently attending.

Northeastern University uses the quarter calendar and awards quarter hours of credit for courses that are successfully completed. Each quarter hour (QH) of credit is equivalent to three-quarters of one semester hour. Most Northeastern courses are equivalent to three semester hours of credit or four quarter hours. Students who successfully complete 48 quarter hours generally qualify for sophomore standing, 80 for middler, 112 for junior, and 148 for senior. All upperclass course selection for transfer students is planned with their faculty advisers.

Application procedure. Transfer applicants should follow the application process described on page 4, with the exception that the SAT or ACT is waived for students who have completed 45 credit hours of college work successfully. In addition, transfer candidates must

- indicate their choice of college and major on the application
- request that an official copy of their high school transcript be sent to the Office of Undergraduate Admission
- request that an official transcript from each college attended be sent to the Office of Undergraduate Admission directly from the registrar's office of the respective colleges
- submit a list of courses in progress for the current academic year (including course number, course title, and number of credits to be earned in each course)
- demonstrate English language proficiency if their first language is not English. See page 3 for details about fulfilling this requirement

Transfer candidates should apply by March 1 for priority consideration. Applications will be reviewed on a space-available basis.

Cooperative Education

Robert E. Vozzella, EdD, *Vice President*

Theresa A. Harrigan, EdD, *Interim Associate Dean*

Candace A. Herene, BA, *Assistant Dean*

Patricia A. Venter, BS, *Diversity Coordinator*

Associate Professors

Betsey W. Blackmer, PT, EdD
 Richard L. Canale, MEd, CAGS
 Elizabeth A. Chilvers, MEd
 Kathleen L. Finn, EdD, RN
 Joyce K. Fletcher, DBA
 Mary R. Flynn, MEd, RN
 Ann M. Galligan, EdD
 Stephen M. Kane, EdD
 Ann C. Noonan, PT, EdD
 John A. Saltmarsh, PhD
 Melvin W. Simms, EdD
 Robert R. Tillman, EdD

Assistant Professors

Michael A. Ablove, MEd
 Donald L. Eastridge, MDiv
 Veronica L. Porter, MEd
 William A. Sloane, MBA

Associate Cooperative Education Coordinators

Charles Bognanni, MEd
 Terry H. Chapman, PhD
 Rosemarie DiMarco, MS
 Jean F. Egan, MEd
 Barbara L. Lechner, MEd
 Martha L. Wengert, MEd
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Assistant Cooperative Education Coordinators

Robert J. Blaser, RPh, MS
 Patrice Brown, MA
 Alicia A. Canali, MEd
 Lisa M. Cantwell, MA
 Jacqueline Diani, MEd
 Jeffrey A. Doughty, BS
 Ellen Duwart, MEd
 Patrick Hickox, MArch
 Karen P. Kelley, MEd
 Susan H. Lavoie, MEd
 Helen C. Mann Ries, MEd
 Kellianne Murphy, MA
 Behrooz (Barry) Satvat, PE, ScD
 Jacqueline F. Sweeney, MS
 Nancy Waggner, JD
 Scott Weighart, MBA
 Francis M. Williams, MEd
 Felicia P. Wiltz, MEd
 Mark L. Yorra, RPh, MS

Cooperative education is based on the principle that what students learn in the workplace is a valuable complement to what they learn in the classroom. For most programs, cooperative education is a degree requirement. The University assists in providing relevant cooperative education experiences and attempts to integrate these experiences into the students' total academic program. The success of the program, however, ultimately depends on student interest and commitment and the cooperation of educators and employers.

Studies show that reinforcing classroom learning with job responsibilities increases a student's motivation and self-confidence. Greater interest in academic work develops when students are able to see the link between co-op experiences and classroom study. Co-op students have opportunities to evaluate career decisions early in their college years, while gaining meaningful work experience before graduation and establishing valuable professional contacts and references. Students also earn experiential learning credit by satisfactorily completing the required components of the cooperative education learning process. The salaries students earn in cooperative education experiences may also help defray a portion of the costs of their education.

Participation in co-op is required of all students except those in the College of Arts and Sciences. Even so, most arts and sciences students nonetheless choose to take advantage of co-op.

Cooperative education curricula leading to the baccalaureate degree generally require five years at Northeastern University. Programs typically consist of a freshman year of three consecutive quarters of full-time study followed by four upperclass years in which students alternate periods of classroom study with cooperative education experiences. The colleges of Engineering, Business Administration, and Computer Science also offer a four-year co-op option.

Responsibility for all phases of the co-op program rests with a faculty coordinator who assists students in deriving maximum benefits from their education at Northeastern. In general, co-op experiences become increasingly challenging and career-specific as students continue their education and acquire greater skills.

Students are not limited to paid employment during a cooperative period. They may wish to pursue a wide variety of experiential learning activities such as travel abroad, volunteer work, or taking specialized courses at another institution.

**International
Cooperative Education**

The Office of International Cooperative Education offers a variety of services to international students as well as to U.S. citizens. Through the International Exchange Program, undergraduates may be placed abroad for their cooperative work experience. Placements abroad are currently available in the United Kingdom, Ireland, France, Spain, Germany, Austria, the Netherlands, Sweden, Australia, New Zealand, and Israel for students who have the appropriate background and experience.

International students may receive assistance on matters relating to their co-op employment, such as Social Security and tax information, as well as on issues involving the verification of their immigration and co-op status. A special course, Working in the U.S., is offered to international students to help prepare them for co-op. Additionally, new opportunities may enable some international students to return to their home countries to work for American and national companies on co-op, especially those countries located in the Pacific Rim region.

Academic Policies

This section presents general information about what is expected of students and how progress toward matriculation is measured. For specific details on their individual degree programs, students should consult their academic advisers.

The University assumes no liability for any delay in providing or failing to provide educational or related services or facilities due to causes beyond the reasonable control of the University. Causes include, but are not limited to, power failure, fire, strikes by University employees or others, weather damage, and acts of public authorities. However, when in its judgment it is appropriate to do so, the University will exert reasonable efforts to provide comparable or substantially equivalent services, facilities, or performance; but its inability or failure to do so shall not subject it to liability.

No faculty member, administrator, or other representative of the University shall make any representations to, or enter into any agreements with, or act toward any student or other person in any manner that is not in conformity with established University policies, practices, and procedures as expressed in this or any other official University document.

Summer Orientation

Undergraduate students entering the University in the fall quarter will participate in summer orientation. This required program is a valuable opportunity to prepare for a successful academic career at Northeastern University. During the months of July and August, new students and transfer students will attend one of ten orientation sessions designed to meet their particular needs. Seven of the sessions are designated for new students; three are designated for transfer students. Each of Northeastern's nine schools and colleges is assigned to specific sessions. Participants will attend a session hosted by the school or college to which they have been admitted.

The summer orientation staff includes orientation leaders, students who will serve as valuable sources of information and assistance throughout the program. In addition to the orientation leaders, staff and faculty from various campus offices and your school or college will be available to answer questions and to provide assistance in making arrangements for the fall. During summer orientation, participants will complete placement exams, meet with representatives from their school or college to develop a fall class schedule, register for classes, and obtain a student identification card. Participants will also learn about life at Northeastern, including services and opportunities that will assist with their transition to the University. In addition, participants will be able to contract for meal plans and complete arrangements for campus housing. The schedule also includes opportunities to tour the campus and participate in activities with other students. Student participants will stay in a campus residence hall during summer orientation. Parents/family will participate in a separate but parallel program and will also be invited to stay in a campus residence hall during this session. Registration information will be mailed to incoming students who have paid their tuition deposit. See page 17 for summer orientation fee information.

Attendance Requirements

The University expects students to meet attendance requirements in all courses to qualify for credit. Attendance requirements vary; it is the student's responsibility to ascertain what each instructor requires.

Failure to meet attendance requirements may force a student to drop the course, as recommended by the instructor and with the approval of the Academic Standing Committee of the college.

Classes for day students are scheduled from 8:00 AM to 5:10 PM, Monday through Friday. Students should not make conflicting commitments until the class schedules for each quarter are final. Schedule changes to accommodate part-time work are difficult and rarely made.

Permission to make up work may be granted by instructors for reasonable cause. Requests must be made immediately upon a student's return to class. Laboratory work can be made up only during the hours of regularly scheduled instruction.

Absence because of student activities. If students must miss classes to participate in athletic contests or other forms of scheduled intercollegiate activity, they are entitled to make-up privileges. Faculty members may require a written statement from the administrator in charge of the activity.

Absence because of illness. A student who is absent from school for an extended period of time must inform the dean of students and his or her college by letter, message, or telephone.

Absence because of religious beliefs. The University maintains the following guidelines regarding student absences because of religious beliefs. "Any student who is unable, because of his/her religious beliefs, to attend classes or to participate in any examination, study, or work requirement shall be provided with an opportunity to make up such examination, study, or work requirement that he/she may have missed because of such absence on any particular day; provided, however,

that such make-up examination or work shall not create an unreasonable burden upon such school. No fees of any kind shall be charged by the institution for making available to the said student such opportunity. No adverse or prejudicial effects shall result to any student because of availing himself/herself of the provisions of this section" (Massachusetts General Laws, Chapter 151C, Section 2B, 1985).

Absence because of jury duty. Members of the University community are expected to fulfill their obligations to serve on a jury if called upon. A student selected for jury duty should inform his or her instructors and/or activity advisers. They will provide a reasonable substitute or compensatory opportunities for any required work missed. Absence will not be penalized in any way.

Class Schedule

All classes start promptly according to the class schedule shown. Students take classes grouped in sequences, as shown in the following chart. Most of the classes at Northeastern are scheduled in the time periods listed during the fall, winter, and spring quarters.

Students may leave fifteen minutes past the scheduled opening of class if the instructor is not present. Students are expected to be punctual. Students who are late for classes should attend for the balance of the period. Instructors will not tolerate habitual tardiness.

Fall, Winter, and Spring Schedule

Business Students	Sequence 1	MWTh	8:00–9:05
	Sequence 2	MWTh	9:15–10:20
	Sequence 3	MWTh	10:30–11:35
	Sequence 4	MTTh	1:35–2:40
	Sequence 5	MTTh	2:50–3:55
	Sequence 6	MTTh	4:05–5:10
	Sequence 7	TF	8:00–9:05
		W	1:35–2:40
	Sequence 8	TF	9:15–10:20
		W	2:50–3:55
	Sequence 9	TF	10:30–11:35
		W	4:05–5:10
	Sequence 10	TWF	11:45–12:50
	Sequence A	MW	8:00–9:40
	Sequence B	W	1:45–3:25
		F	8:00–9:40
	Sequence C	MW	9:55–11:35
	Sequence D	TF	11:45–1:25
	Sequence E	TTh	1:45–3:25
	Sequence F	W	3:30–5:10
Business Students		F	9:55–11:35
	Sequence G	TTh	3:30–5:10
	Sequence H	M	3:30–5:10
		F	1:45–3:25
	Sequence I	M	1:45–3:25
		W	11:45–1:25
	Sequence J	TTh	9:55–11:35
	Sequence K	TTh	8:00–9:40
Business Students	Sequence 1	MWTh	8:00–9:05
	Sequence 2	MWTh	9:15–10:20
	Sequence 3	MWTh	10:30–11:35
	Sequence 4	MTh	11:45–12:50
		W	1:00–2:05
	Sequence 5	MTh	1:00–2:05
		W	2:15–3:20
	Sequence 6	MTh	2:15–3:20
		W	3:30–4:35
	Sequence A	MW	8:00–9:40
	Sequence B	MW	9:55–11:35
	Sequence C	TTh	8:00–9:40
	Sequence D	TTh	9:55–11:35
	Sequence F	M	1:45–3:25
		W	2:15–3:55
	Sequence G	TTh	11:45–1:25
	Sequence H	TTh	1:45–3:25
	Sequence I	TTh	3:30–5:10

Summer Schedule

Business Students	Sequence 1	MWTh	8:00–9:05
	Sequence 2	MWTh	9:15–10:20
	Sequence 3	MWTh	10:30–11:35
	Sequence 4	MTh	11:45–12:50
		W	1:00–2:05
	Sequence 5	MTh	1:00–2:05
		W	2:15–3:20
	Sequence 6	MTh	2:15–3:20
		W	3:30–4:35
	Sequence A	MW	8:00–9:40
	Sequence B	MW	9:55–11:35
	Sequence C	TTh	8:00–9:40
	Sequence D	TTh	9:55–11:35
	Sequence F	M	1:45–3:25
		W	2:15–3:55
	Sequence G	TTh	11:45–1:25
	Sequence H	TTh	1:45–3:25
	Sequence I	TTh	3:30–5:10

Activities hours. Undergraduate activities hours are Monday and Thursday, 11:45 AM–1:25 PM during fall, winter, and spring quarters. Summer activities hours are Wednesday, 11:45 AM–12:50 PM. No classes or other academic functions are held during these hours. Violations of this regulation should be reported to the Office of Student Affairs or to the Student Government Association.

Grading System

Grades are officially recorded by letters, evaluated as follows.

Grades	Numerical equivalent	Status
A	4.000	Outstanding achievement
A–	3.667	
B+	3.333	
B	3.000	Good achievement
B–	2.667	
C+	2.333	
C	2.000	Satisfactory achievement
C–	1.667	
D+	1.333	
D	1.000	Poor achievement
D–	.667	
F	.000	
I		Incomplete in a letter-graded course
S		Satisfactory achievement in pass/fail course; counts toward degree requirements
U		Unsatisfactory achievement in pass/fail course
W		Course withdrawal
X		Incomplete in a pass/fail course

An I or X grade shows that the student has not completed the course requirements. An average grade of D or less is not acceptable and will not allow a student to continue at Northeastern University.

Individual faculty may choose not to use plus or minus designations. If faculty elect to use only whole letters, they must announce this to the class at the beginning of the quarter.

Quality-point average. Numerical equivalents for scholastic averages are weighted according to the number of hours the course carries. For example, a grade of A in a course carrying 3 quarter hours is weighted at 12. A grade of C in a course carrying 2 quarter hours is weighted at 4. The quality-point average for both courses would then be 12 plus 4, divided by 5, or 3.2. Grades of X, I, S, and U are not included in the calculation of the quality-point average.

Credit hours. Credit hours are assigned to a course based on the established educational standard that one credit hour is equal to approximately three hours of student learning time per week over a period of a quarter, semester, or term (usually one hour of lecture or discussion, plus two hours of individual study outside class). When much individual study is involved, as in directed study or certain graduate courses, each additional hour of credit should represent at least three hours of student work.

Transfer of credits. With the approval of the academic dean a student in one of the full-time day programs may take courses in University College, the School of Engineering Technology, graduate school, or the part-time engineering program and have those courses and grades recorded on the permanent record. Degree credit may be granted for transfer work from other institutions; students should check with the dean's office of their college.

Pass/fail system. The individual schools and colleges state how and when the pass/fail system may be used. An outline of the general system follows.

- Any student not on academic probation may, beginning in quarter four, register for one pass/fail course per quarter if permission is granted by the college in which the student is enrolled and if the course is offered on a pass/fail basis. Freshmen and upperclass students may take one-quarter-hour courses in physical education on a pass/fail basis in any quarter. Enrollment in these courses does not prevent upperclass students from electing an additional four-quarter-hour course on a pass/fail basis.

- Pass/fail courses are normally restricted to electives outside the major field. The college faculty, however, may choose to adopt the pass/fail system of grading when it appears pedagogically sound for required courses within a program.

- Individual faculty members may decide whether any of their courses may be taken on the pass/fail system of grading, except when uniformity is necessary. In such cases, the department and/or college faculty offering the course determine whether the pass/fail system is used.
- Grades recorded on the basis of the pass/fail system do not figure in the computation of the quality-point average. Satisfactory completion of all courses taken on the pass/fail system is designated on the student's permanent record by the letter S. Unsatisfactory work is designated by the letter U. Any unsatisfactory grade must be handled according to the existing policy of the college but must never be cleared through the election of the same course pass-fail, except when this system is the only one used by the college for grading the course.
- An incomplete in a course taken on a pass/fail basis is designated by the letter X on the permanent record and treated according to the normal procedure for incomplete grades.
- To use the pass/fail system students must meet all prerequisites for the course. They have until the end of the second week of the quarter to declare their intention to receive a pass/fail grade. This deadline may be extended to the end of the eighth week at the option of the instructor.

Quarterly status reports. Grades are mailed to students approximately three days after each quarter. A missing grade ("*" on grade report) means that none was turned in by the instructor. Take up the matter of a missing or erroneous grade directly with the instructor.

Dean's list. A dean's list, or honors list, is issued at the end of each quarter containing the names of students who have a 3.25 quality-point average or higher with no I grade or grade below C-. Students who are on any form of probation, who are enrolled in a course on a pass/fail basis (except where there is no alternative or where required by the program), or who are not carrying a full load as determined by their undergraduate college are not eligible. With a few exceptions as approved by the respective colleges, a full load is considered to be four courses or sixteen quarter hours.

Alternative-year freshmen are eligible for the dean's list when they become sophomores in one of the full-time day programs.

Procedure for clearing an I or changing other grades. An incomplete (I) grade may be reported by the instructor when a student has failed to complete a basic component of a required course, such as homework, a quiz or final examination, a term paper, or a laboratory project. Students can make up an I grade by satisfying the requirements of the instructor or, if the instructor is absent, the chair of the department. Be aware that instructors' policies on the granting of incomplete grades may vary, and that the final decision on an incomplete grade is up to the instructor. The period for clearing an I grade and for changing a grade other than an I or failure (F or U) is restricted to one calendar year from the date it is first recorded on the student's permanent record.

Freshmen with multiple course deficiencies, including incomplete (I) grades, do not have a calendar year's time to rectify the deficiencies.

Students who make up an I grade by taking a different course or repeating the same course will be given a new grade and billed accordingly.

To clear an I grade, a student must obtain a triplicate form on which the precise agreement for clearing an incomplete (I or X) grade is specified and which is signed by the student and the instructor. Forms are available in the department office. The student must make an appointment with the instructor to arrange for clearing the I grade. He or she must then complete the form, sign the agreement, and obtain the instructor's signature; leave a copy with the instructor, take one copy to the dean's office, and retain a copy as a personal receipt.

Any exception to this policy on change of grades must be recommended by the Academic Standing Committee of the college in which the course was offered and must be forwarded in writing by the dean to the registrar for implementation. (This process must be completed within one calendar year from the end of the quarter in which the course was offered.)

Commencing with grades given in the fall quarter of 1986, the University policy has been that any grade outstanding for twelve or more months cannot be changed.

Make up of deficiencies or failures. Students can make up failures by repeating the same course in the full-time day program. Both grades remain on the transcript but only the new grade is used for calculation of quality-point average. With permission from their dean's office, students may substitute an appropriate different course taken in the full-time day program or elsewhere. Credits earned elsewhere, including University College, are treated as transfer credits. Grades below C are not accepted for transfer credit.

Remedial/compensatory courses. Remedial/compensatory courses are currently offered for credit through different programs and colleges. While credit for remedial courses may be given, not all colleges or departments will apply these credits to major, distribution, or graduation requirements. Students should consult their advisers for specific information.

Examinations

Final examinations are held during the last week of each quarter. An examination schedule is posted at midterm on the registrar's official bulletin board and the student information kiosks. No examinations longer than one-half hour may be given in the week before final examinations. It is the student's responsibility to know the time and location of each of his or her examinations. Final exam conflicts, defined as two exams at the same hour or three exams in one day, will be resolved with the help of the Office of the Registrar, 120 Hayden Hall, but only if reported before the last full week of classes.

A list of rules of conduct during examinations follows.

- Students must concentrate on their own work.
- Under no circumstances may a student communicate in any way with another student during an examination.
- Each student must work in a manner that does not bother other students.
- No unauthorized material is allowed in the examination room.
- Unless otherwise specified by the instructor and so understood by the head proctor, students who bring such materials as books, notebooks, and papers into a final-examination room must leave them either at the front or rear of the room or against the walls, at the option of the head proctor.
- All written material must be kept on the right arm of the chair. (In rooms with tables, materials are to be kept in front of students.)
- Proctors cannot answer questions about the examination material; students should ask questions that concern only possible typographical errors in the text or missing parts of the examination.
- No student may leave the room during the first thirty minutes of the examination. Late students may not enter the examination room if any other student taking the examination has already departed. Late students do not get extra time.
- Material may not be borrowed during the examinations.
- Students may leave the examination room permanently after thirty minutes have elapsed, but during the last ten minutes of the examination no one will be allowed to leave the room. Students remaining until the end of the examination must cease work immediately when the head proctor announces the close of the examination and must remain quietly seated until all examination materials have been collected.
- Students who become ill during an examination and are unable to complete the examination must report to the Lane Health Center immediately.
- Students must turn in all examination materials before leaving the room unless the instructor indicates that copies may be retained.
- With permission of the instructor, students may submit a stamped, self-addressed postcard with the final examinations in order to receive grades early.

Academic Progression Standards

Each college establishes academic progression standards for its own undergraduate students. To progress from one academic year to the next, students must meet the minimum quality-point average(s) (QPAs) and number of earned quarter hours required by their college/program. In addition, many programs require that specific courses be successfully completed to progress to the next year. Students who do not make satisfactory progress will not graduate with their class and may be withdrawn. For more information about academic progression standards for each college, program, or major, please refer to college guidelines which can be found either in individual college guidebooks or in the college sections of this *Undergraduate Catalog*, starting on page 24.

Academic eligibility for participating in student organizations. All students must have a minimum 2.0 overall grade point average in order to be eligible for an elected or appointed leadership position in any student organization.

Repeating classes to clear deficiencies. Students may, with approval, repeat a course or take a substitute course in the full-time day program to clear a deficiency. The final grade for this course replaces the former grade. Students who are repeating courses outside the full-time day program to raise their quality-point average or to clear a deficiency must attain an average of 2.0 in all repeated work.

Graduation Requirements

To be eligible to receive degrees, graduating students must clear all academic, financial, cooperative work, or disciplinary deficiencies. See individual programs for specific academic requirements for graduation.

Attendance at commencement is optional. Information concerning commencement is mailed to all graduating students during the spring quarter for June graduation or summer quarter for September graduation.

Seniors are notified by mail if they fail to qualify for their degrees. No special notice is sent to those who do qualify. Students who are in doubt should call their dean's office. The University has a residency requirement of a minimum of three full-time quarters at Northeastern immediately preceding graduation.

Graduation with honor and selection as the class marshal (June only) are reserved for students who have been registered as full-time students at Northeastern University for at least seventy-two quarter hours.

Quality-point average	Honor conferred
3.25–3.49	Graduation with honor (<i>cum laude</i>)
3.50–3.74	Graduation with high honor (<i>magna cum laude</i>)
3.75–4.00	Graduation with highest honor (<i>summa cum laude</i>)

Registration Procedures

Course prerequisites. Students are expected to meet prerequisites as listed in the course description of each course in which they enroll. Grades of F, U, I, X, or W in prerequisite courses do not normally fulfill requirements. Exceptions must be authorized by the academic department offering the course and be approved by the office of the dean of the student's college.

Declaring majors and minors. Undergraduate students generally declare their majors upon admission to the University or in the spring quarter of their freshman year. Majors are described under the various schools and colleges. Students may earn a minor in any undergraduate discipline that designates a minor. Students should declare their intent to earn a minor as early as possible, and no later than the end of the junior year, by applying to the minor department. During the final term, the department offering the minor ensures that it appears on the student's academic record shortly after graduation by informing the registrar of the completion of the minor.

Internal and external transfer students. To transfer to another college within Northeastern University or to change majors within the same college, students should contact the appropriate office for their academic level. Freshmen and upperclass students should consult the office of the dean of the college to which they want to transfer. A transfer to another college is not automatic but is based on a number of factors, including academic achievement and availability of space.

External transfer students are those who previously attended a college other than full-time day college at Northeastern. At the time of their admission, external transfers are identified as either freshmen with advanced standing or upperclass transfer students. Freshmen with advanced standing are those accepted with less than the equivalent of thirty-six quarter hours of transfer credit. They are included in the freshman class in quarter one, two, or three.

Upperclass transfer students have been accepted into a full-time day college with enough transfer credit to enable them to enter as sophomores, middlers, or juniors. Programs for upperclass transfers are generally planned with advisers in the offices of the department and dean.

Special students. Students not regularly enrolled in a full-time day college may, in certain instances, enroll on a quarter-by-quarter basis in some courses given in those colleges. Approval and further information must be obtained from the dean of the college offering the specific course.

Overload policies. Inasmuch as withdrawal from a course can be accomplished up to the eighth week, no rebate or credit is granted when a student voluntarily drops a course. An exception can be made if the withdrawal takes place during the first week, but a student should raise the issue at that time.

Students who enroll in overload courses will be billed at the overload rate, 1/16 of the tuition for that quarter, per quarter hour.

Any upperclass student taking a full course load may elect to take an additional enrichment course without charge. No credit is given for this course. The procedure for taking this course is as follows: Confer with your dean or his or her designee to establish eligibility under the conditions that this course will be a four-quarter-hour basic college course; be the only such tuition-free course permitted during the upperclass academic year; be in addition to the normal course load for the quarter; be on a space-available basis on registration day, with priority given to tuition-paying students; not contribute to fulfilling degree requirements or to the calculation of the quality-point average or total earned hours.

Should you later petition to have credits earned in this course apply to your degree, you must: (a) obtain the approval of your dean or his or her designee; (b) pay tuition at the rate current at the time of petition; and (c) complete the process by May 1 of your senior year. After you and the dean or his or her designee have filled out and signed the necessary form, take the appropriate copy to the Office of the Registrar no later than the second week of the quarter.

Any student who registers for more quarter hours in a quarter than an existing curriculum allows is liable for the extra charges.

Division conflicts. Students who are in the wrong division for a given quarter will be purged from all preregistered courses for that quarter unless their division assignment is correct one month prior to the start of that quarter. Students must contact their college dean's office and/or Cooperative Education to correct their status.

Dropping courses. To drop a course, students must first obtain a course drop form at the registrar's or college dean's office. Not attending a class does not constitute withdrawal. Students must fill out the course drop form and have it signed by their instructor and by a representative of either their college dean or the department that offers the course. After obtaining all required signatures, students must return the original copy to the Office of the Registrar and keep a copy for themselves.

Course withdrawals are permitted through the third week of the quarter without any grade recorded on the permanent record. Course withdrawals at any time during the fourth through the eighth week of the quarter are indicated by a W on the record. After the eighth week, no withdrawals are accepted for any reason. At this point, a letter grade is posted on the record. A faculty member may choose not to sign a course withdrawal form if the student was involved in any kind of academic dishonesty in the class.

Change of name. Report all name changes to the Office of the Registrar immediately. This is especially important when students marry and wish to use a new name on University records.

Change of address. Notify the Registrar, Bursar, or Financial Aid promptly of any address change. Both the permanent home address and the local address are needed.

Transcripts. To obtain an official transcript, students (and alumni/ae) must send a check in the amount stipulated by the Office of the Bursar, mailing instructions, and a disclosure waiver, if necessary, to the transcript office at 117 Hayden Hall. To request a transcript in person, first obtain an official receipt from the Office of the Cashier at 248 Richards Hall; then present the receipt and a valid photo ID at 117 Hayden Hall. Telephone and fax requests are not accepted, and no transcripts can be faxed from the University. Currently enrolled students can obtain unofficial transcripts in person from the student information kiosks located around campus. Students not currently enrolled can obtain an unofficial transcript in person only by presenting a valid photo ID at 117 Hayden Hall.

Withdrawal from the University. Students seeking to withdraw from the University for any reason should begin the process at the appropriate office for their academic level. Students should contact the office of the dean of their college. Students wishing to transfer should consult the dean's office for their school or the Office of Student Affairs.

Students may be withdrawn from the University for financial, disciplinary, academic, or health reasons. In the last case, a committee will review the recommendations of the director of health services to determine whether the student should withdraw. The student has an opportunity to present his or her case to the committee. Withdrawals are made only when it is determined that the student is a danger to himself or herself or to other members of the University community, or when the student has demonstrated behavior detrimental to the educational mission of the University.

Procedures for student leave of absence for medical reasons. After the eighth week of the quarter students may withdraw from coursework (leave of absence) only for medical reasons. A student taking a leave of absence from academic work for medical reasons must contact the dean's office of his or her college. Medical reasons are considered to include both physical and emotional well-being. A representative of the dean's office will discuss the situation with the student and refer the student to the Lane Health Center with a petition form. The petition for a medical leave of absence must be made prior to the end of the quarter. The student's physician must provide appropriate medical information to the Lane Health Center physician. A student who is on co-op when he or she needs a medical leave of absence must contact the co-op coordinator.

A medical leave of absence may be effective for up to six months. During this period the student maintains all the rights and responsibilities of a Northeastern University student. If the student is covered under the Northeastern-sponsored Blue Cross/Blue Shield insurance, it remains in effect. After six months the student must obtain re-entry or be withdrawn from the University.

When the student is ready to return to the University, he or she must again contact the appropriate college representative, who in turn refers the student to the Lane Health Center. The center must be provided with medical documentation validating the treatment and the student's fitness to return to school. Strict confidentiality is maintained in all aspects of medical leaves of absence. Exceptions to these procedures are handled by the appropriate academic standing committee.

College Expenses

All students registered in a full-time day college are charged full tuition for coursework of twelve quarter hours or more. In addition, charges are made for coursework beyond the normal academic schedule. Students should note that the freshman year consists of three quarters of full-time study. The co-op program does not begin until sophomore year.

Full payment of tuition, residence hall fees, and other related charges are due prior to the start of each academic quarter. The payment due dates are as follows.

Fall Quarter

Freshmen	August 01
Upperclass	August 19

Winter Quarter

Freshmen and Upperclass	November 25
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Spring Quarter

Freshmen and Upperclass	February 26
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Summer Quarter

Freshmen and Upperclass	May 19
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The following are accepted methods of payment.

- Check or Money Order made payable to Northeastern University.
- Mastercard, Visa, or Discover. Payments may be made in person or by calling our 24-hour automated charge line, 617-373-2319 or, outside (617) area code, 800-937-4067.
- Enrollment in one of our payment plans described below.

Students are responsible for the prompt payment of all bills. If a bill has not been received by the first week of the quarter, please go to the Bursar's Office where a bill will be created for you. Any discrepancies in your bill should be brought to the attention of the Bursar's Office. If there is a billing problem, pay the undisputed portion of the bill to avoid any additional late fees.

Northeastern's monthly payment plan. You may opt to enroll in our extended payment option, which allows you to spread your tuition costs for an academic year, less Financial Aid, over 12 monthly payments. Contact Academic Management Services at 800-635-0120 for additional information.

Overloads. Tuition charged on a per-quarter basis covers the cost of each student's required courses for that quarter. A student registered for 12–16 quarter hours for the quarter may register for an additional one quarter-hour course without added charge. Any courses beyond this will be billed to the student at the appropriate overload rate.

Delinquent balances. In cases of student default on tuition payments, the student is liable for the outstanding tuition, as well as for all reasonable collection costs and any legal fees incurred by the University during the collection process. Accounts may be subject to monthly interest charges.

Transcripts and other academic records will not be released until all financial obligations to the University have been met.

1996–1997 Tuition

Undergraduate Basic Day Colleges

Freshmen (3 quarters)	\$15,045
Upperclass students (2 quarters)	\$13,370

Tuition rates, room and board charges, and fees are subject to revision by the board of trustees at any time. In addition to the tuition listed above, students should estimate costs for supplies, personal expenses, and transportation. Students planning to live on campus should refer to Room and Board on page 17.

The following fees are required of all students.

Application fee. This nonrefundable \$50 fee must accompany an application for admission.

Tuition deposit. A nonrefundable tuition deposit of \$200, which is applicable towards the first quarter's tuition, is due by May 1 from all students entering in September. Students entering at other times of the year should note the required deposit date on their letter of acceptance.

Summer orientation fees. Summer orientation registration materials will be mailed to incoming students who have paid their tuition deposit. The summer orientation is a mandatory program for all new and transfer students enrolled in classes for the fall quarter. A nonrefundable fee must accompany the student registration for summer orientation. This fee covers all program materials, meals, and housing. The fee is \$130 for new students and \$105 for transfers. Session changes once assigned will increase the fee by \$10 to cover related administrative costs. Students should contact the Office of New Student Orientation and Commuter Services if they wish to make payment arrangements for their summer orientation fee. Each parent or family member who will attend the parents/family summer orientation program must also include the nonrefundable fee of \$105 with his or her registration.

Student services fee. Students pay a \$50 quarterly student center fee to support the Ell Student Center and a \$13.50 quarterly student activities fee to support student clubs.

Photo-identification card. This card is issued to new full-time students at orientation and registration. Students must have a properly validated card to use most University facilities. A replacement card costs \$5.

University health insurance. The University provides hospital insurance for all students who have matriculated, are carrying a course load of nine credits or more, or who are in a full-time program. This program is mandated by the Commonwealth of Massachusetts.

Students who are covered under a comparable hospital insurance plan may waive the University-offered insurance program by filing a waiver available at the Bursar's Office. Deadlines for waiving are applicable. A waiver form must be completed annually at the start of each academic year.

Sports pass fee. This \$45 fee (\$25 if student begins classes in winter quarter) allows students to attend all regular home games without additional charges.

Other fees may include the following.

Housing deposit. New students seeking on-campus housing must submit a nonrefundable \$400 deposit along with a completed housing application form to complete the housing application process. The upperclass housing deposit is \$75 per quarter.

Residential infirmary fee. All on-campus residents pay a quarterly \$25 fee for the use of the Lane Health Center Infirmary.

Residence hall activities fee. All students living in the residence hall system pay a quarterly \$15 fee for activities sponsored by the Residence Student Association.

Late fees. All accounts not paid in full by the indicated due dates will be subject to a late fee of \$200.

International student fee. A one-time fee of \$200 is charged to new undergraduate international students, payable after their acceptance at Northeastern University. The fee supports services available at the International Student Office.

Laboratory fees and deposits. Students taking laboratory courses should be prepared to purchase laboratory cards at the Cashier's Office, as directed by the department offering the course. Rates vary depending on the lab.

Liability insurance. Liability insurance must be carried by students as required by the academic program. This fee of \$18 is charged once per year.

Room and Board

At the beginning of the first quarter, all entering freshmen living in University residence halls will be billed for the nineteen meals per week option (\$1,240). Once on campus, freshmen may select either a ten or fifteen meal plan option.

Returning upperclass students must apply for housing each quarter.

Standard Residences (per quarter)

Residence Halls	Single	Double	Triple
Kerr	\$1,600	\$1,395	
Light	\$1,600	\$1,395	\$1,275
Melvin	\$1,600	\$1,395	\$1,275
Smith	\$1,600	\$1,395	\$1,275
Speare	\$1,600	\$1,395	
Stetson	\$1,600	\$1,395	\$ 995
White Hall	\$1,600	\$1,395	
Kaufman Buildings	\$1,960	\$1,600	\$1,400

Suites	Single	Double	Triple	
Kennedy Hall	\$1,600	\$1,395	\$ 995	
153 Hemenway		\$1,395	\$1,275	
Apartments	Single	Double	5 Bed	6 Bed
Loftman Hall	\$2,065	\$1,635	\$1,560	\$1,525
Apartments	Single	Double	Triple	Quad
Burstein Hall	\$1,905		\$1,285	\$1,275
Rubenstein Hall	\$1,905	\$1,570	\$1,285	\$1,275
60 The Fenway	\$1,960	\$1,770		\$1,600
319 Huntington	\$1,960	\$1,250	\$1,385	\$1,300
337 Huntington	\$1,960	\$1,545	\$1,385	\$1,020
407 Huntington	\$1,960			\$1,440
106, 110, 116, 122				
St. Stephens St.	\$1,960	\$1,555		\$1,300
121 St. Stephens St.	\$1,960	\$1,600		
Willis Hall	\$2,065	*\$1,810		*\$1,520
142-148 Hemenway				\$1,445

*Non-renovated apartments

The rates listed above are for standard room accommodations only. Rates can vary based upon adjusted capacities and room size or occupancy.

Freshman residence termination fee. Students who sign the license agreement are required to live on campus for the terms of the agreement. Students who fail to honor their agreement will be subject to a termination fee of 50% of subsequent quarters room charge.

Other residence rate adjustments. Students who terminate their license agreements before the third quarter, either voluntarily or involuntarily, will be assessed charges as outlined in the Residence Hall and Dining License Agreement.

Residence rate adjustments may be made provided specific conditions are met and a housing withdrawal form has been filed with Residence Life Office. Details regarding these conditions may be found in the Residence Hall and Dining License Agreement.

Freshmen and transfer students should refer to the Residence Hall and Dining License Agreement for specific rate adjustment information.

The standard adjustment rates for upperclass and upperclass graduate students are:

During the first week	75% credit
During the second week	50% credit
During the third week	25% credit
After the third week	no credit

University Dining Service

All students who live in traditional University residence halls and suites are required to participate in the food plan run by University Dining Service.

Meals per week	Cost per quarter
19	\$1,240
15	\$1,120
10	\$1,010
5	\$ 500 upperclass only

Husky plan. Students may deposit funds into a dining plan, which allows them to "drawdown" from the account to purchase food or other items available at specific locations throughout the campus. Contact University Food Services at 617-373-2481 for additional information.

University-Wide Programs

Honors Program

The University invites qualified students in each of its colleges to participate in a comprehensive honors program designed to foster high intellectual development and achievements. Based on criteria established by an individual college for its own majors, students are invited into the program as entering freshmen or as entering sophomores (based on Northeastern freshman-year grades). Other students may be recommended or express interest on their own at later points in their undergraduate careers.

Special limited-enrollment sections of many first- and second-year courses are offered for honors students. Honors seminars on interdisciplinary subjects are open to honors students. Junior/senior honors projects or courses are required of students in the program.

Honors and standard sections of courses are usually equivalent in terms of satisfying degree requirements and are distinguished by course number. For example, the honors section of ECN 1115 is ECN 1715; for PHL 1100 it is PHL 1700. An updated list of offerings is available in the honors program office and also appears in the registrar's course listings.

There are two other types of honors courses. *Honors within a standard course* are activity courses that allow students to substitute special work for some of the standard assignments within the course. *Honors outside a standard course* are adjunct courses that carry an additional one quarter-hour credit so that students receive two grades: one in the standard course and one in the honors adjunct. This one quarter-hour course may be taken only with another standard course and represents the enriched work that makes the entire five quarter-hour honors course. Activity and adjunct courses only appear on the listing in the honors program office. Because they do not carry separate numbers, activity and adjunct courses do not appear as honors-level in the registrar's course listings. Honors courses may be taken as a free overload. Criteria for free overloads are available in the honors program office.

The honors program also sponsors extracurricular cultural and recreational activities. Students may choose special honors housing in 115–119 Hemenway Street and/or use the honors lounge, study room, and computer room in 1 Nightingale Hall.

For more information on honors courses, on how to qualify to take courses, and on other aspects of the program, contact the honors program at 617-373-2333 or drop by 1 Nightingale Hall.

For academic credentials to be considered for the following scholarships, a completed admissions application should be submitted no later than January 1 preceding Fall enrollment.

Merit Scholarships

Ambassador Award. The University offers five half-tuition scholarships for exceptional academic achievement to non-U.S. citizens for the freshman year (September through June). The Ambassador Awards are given to freshmen enrolled in a full-time day academic program and are not renewable.

Boston Youth Leadership Award. Award: \$6,500 grant for campus room and board. Awards are renewable for recipients who maintain normal progress toward their degree with a minimum grade-point average of 3.0. *Eligibility:* Applicants for fall freshman admission to Northeastern University who have demonstrated outstanding community leadership and service and who will graduate in the top quarter of their class at a Boston public, private, or parochial school. Awardees must reside on campus and follow procedures to receive state and/or federal education grants to which they may be entitled.

Carl S. Ell Scholarship. Award: Full tuition, room, and board (based on double occupancy). Awards are renewable for recipients who maintain normal progress toward their degree with a minimum grade-point average of 3.25. *Eligibility:* Applicants for fall freshman admission to Northeastern University who will graduate from high school in the top 5 percent of their graduating class with a combined math and verbal score of 1250 or higher on the Scholastic Assessment Test (SAT). Awardees must reside on campus, maintain enrollment in the Honors Program, and follow procedures to receive state and/or federal education grants to which they may be entitled.

Northeastern University Merit Scholarship. Award: Full tuition scholarship plus \$2,000 campus room and board grant. Awards are renewable for recipients who maintain normal progress toward their degree with a minimum grade point average of 3.25. *Eligibility:* Awards guaranteed to National Merit Scholarship program finalists and semi-finalists who reside in the six New England states, graduate in the top 15 percent of their high school class, and complete the financial aid and admission application process by stated deadlines. Awardees must reside on campus and follow procedures to receive state and/or federal education grants to which they may be entitled.

Ralph J. Bunche Scholarship. Award: Full tuition, room, and board (based on double occupancy). Awards are renewable for recipients who maintain normal progress toward their degree with a minimum grade point average of 3.00. *Eligibility:* Applicants for fall freshman admission to Northeastern University who are African American and who will graduate from high school in the

top 10 percent of their graduating class with a combined math and verbal score of 1150 or higher on the SAT. Awardees must reside on campus and follow procedures to receive state and/or federal education grants to which they may be entitled.

Reggie Lewis Memorial Scholarship. *Award:* Full tuition scholarship plus \$2,000 campus room and board grant. Awards are renewable for recipients who maintain normal progress toward their degree with a minimum grade point average of 3.00. *Eligibility:* Applicants for fall freshman admission to Northeastern University who are members of a federally designated ethnic minority group and will graduate from high school in the top 20 percent of their graduating class with a combined math and verbal score of 1150 or higher on the SAT. Awardees must reside on campus and follow procedures to receive state and/or federal education grants to which they may be entitled.

Compensatory Courses

Compensatory courses in English and mathematics are for freshman native speakers of English whose reading, writing, and/or mathematical skills need strengthening.

The University uses one or more of three criteria to determine which freshmen participate in the compensatory programs: pre-college academic credentials, tests administered during orientation week, or performance in ENG 1110, Freshman English 1.

In general, the program consists of five courses, each offering four hours of credit. The courses must fit into the following sequences.

Fall*

MTH 1000	Mathematical Preliminaries 1
ENG 1110	Freshman English 1†
or	
ENG 1013	Fundamentals of English 1

Winter*

MTH 1010	Mathematical Preliminaries 2
ENG 1014	Fundamentals of English 2

Please note that successful completion of Mathematical Preliminaries 1 and 2 is a prerequisite for: MTH 1101, MTH 1106, MTH 1107, and MTH 1108

Nonbusiness mathematics sequence; and
Business mathematics sequence

MTH 1113 and MTH 1114

A passing letter grade in Freshman English 1 or Intensive Writing is a prerequisite for:

ENG 1111	Freshman English 2
ENG 1111-ENG 1113	Engineering sequence
ENG 1111	Engineering technology

*The same sequence is offered winter/spring for students who enter in January.

†Students whose work in this course is unacceptable for success in ENG 1111, Freshman English 2, will receive a grade of S and must complete ENG 1014, Fundamentals of English 2.

Schedule for Continuation of Compensatory Programming

Acceptance for credit is determined by the faculties of the individual colleges and is therefore subject to change. The chart below outlines policies on compensatory courses. Asterisked (*) courses are graded pass/fail and therefore are not included in the student's quality-point average. A yes designates acceptance for credit, a no designates non-acceptance, and an n/a, not applicable.

	English 1 (ENG 1110/1013)	English 2 (ENG 1014)	Mathematical Preliminaries 1* (MTH 1000)	Mathematical Preliminaries 2* (MTH 1010)
Arts and Sciences	yes	yes	yes	yes
Business Administration	yes	yes	yes	yes
Computer Science ¹	yes	yes	n/a	n/a
Criminal Justice	yes	yes	yes ²	yes ²
Engineering ¹	n/a	n/a	n/a	n/a
Engineering Technology	yes	yes	n/a	n/a
Nursing	yes	yes	no	no
Pharmacy and Health Sciences	yes ³	yes	no	no

¹This college offers MTH 1120 and MTH 1121, a course sequence in college calculus with algebra and trigonometry, to students who test deficient in mathematics. The sequence involves extra work in algebra and trigonometry and covers the same material as the regular freshman calculus sequences.

²Students whose diagnostic examinations suggest a need for basic mathematics may elect MTH 1000 or MTH 1010 to prepare for MTH 1106, Fundamentals of Mathematics.

³This college will accept ENG 1110 or ENG 1014 for credit only with a letter grade. Students who complete English courses must still take a four-credit English elective.

ROTC, Military Officers' Training Program

Army

The Department of Military Science offers the Reserve Officers' Training Corps (ROTC) program. The goal of ROTC is to develop men and women with leadership potential and prepare them for an officer's commission in the military service of the United States. The curriculum teaches principles of personnel management and seeks to develop leadership traits such as teamwork, ready acceptance of responsibility, the desire to achieve, self-confidence, and discipline.

The Army ROTC program is conducted at Northeastern. The Air Force and Navy ROTC programs are conducted at Boston University. For more information, write or call the Department of Military Science, 430 Parker Building, Northeastern University, Boston, MA 02115, 617-373-2372.

Richard W. Lacroix, Lt. Col., U.S. Army, MS, *Professor and Chair,*
Department of Military Science

Assistant Professors

William J. Callahan, Maj., MA
Kerry M. Granfield, Capt., BA
Stephen E. Herring, Capt., BA

Completion of the program can lead to an officer's commission in the United States Army, Army National Guard, or United States Army Reserve.

The program consists of the basic course (freshman and sophomore years) and the advanced course (middler, junior, and senior years). It does not conflict with co-op schedules.

Enrollment in the basic course is voluntary and is open to all full-time students who are United States citizens. Students in the basic course do not incur a military obligation.

The advanced course is open to all qualified students who meet these prerequisites: completion of the basic course (or approved equivalent), or prior honorable military service; physical aptitude and medical requirements; and age requirements. Advanced course students receive a \$150-per-month stipend while in school. They are also paid for the six-week advanced camp they normally attend between their junior and senior years. Uniforms are issued to cadets without cost except for a refundable uniform deposit.

Full-time students meeting specific requirements may apply for scholarships covering their last four, three, or two academic years. These are merit-based scholarships, and a student's earnings during cooperative work periods do not reduce scholarship payments. The Army ROTC scholarship program is a tiered system, offering \$12,800, \$9,000, \$5,000, and \$3,000 scholarships. Scholarship students also receive allowances for textbooks and a \$150-per-month stipend while in school.

Transfer students, whether or not previously enrolled in ROTC, are welcomed to join the program. They should contact the Department of Military Science concerning their options for program enrollment. Honorably discharged veterans (enlisted) are a vital part of our cadet corps and will receive special consideration for ROTC enrollment.

Air Force

Department of Aerospace Studies, Boston University

The Air Force Reserve Officers' Training Corps (AFROTC) program offers students an opportunity to earn a commission in the United States Air Force. The student is commissioned as a second lieutenant upon completion of both the aerospace studies (AS) curriculum and the requirements for an undergraduate or graduate degree. AFROTC classes and leadership laboratories are conducted on the Boston University campus. For more information, write the Department of Aerospace Studies, Boston University, 118 Bay State Road, Boston, MA 02215-1501, or call 617-353-4705.

The AFROTC program offers a four-year and a two-year program. Undergraduates may join the four-year AFROTC program by registering for the appropriate aerospace studies classes. Students from all academic disciplines, including five-year co-op, may register. Preferred entry is the first quarter of the first year, although students may enter as late as November of the sophomore year.

Academic coursework focuses on the functions and organizations of the Air Force, military history with an emphasis on the use of airpower, management techniques, and international relations and the impact policies have on the defense establishment. In addition, weekly leadership laboratories introduce students to Air Force customs and leadership skills. The Air Force uniform and AFROTC books are provided to the student free of charge except for a refundable uniform deposit.

Participation in AFROTC by nonscholarship students during the first two years of the four-year program carries no commitment to serve in the Air Force. The nonflying commissioned graduate incurs a four-year active duty service commitment. Navigators incur a six-year post-training commitment, and pilots incur an eight-year post-training commitment.

For entry into the two-year program students must have at least six remaining academic quarters of undergraduate or graduate study, meet Air Force physical standards, be of good moral character, and successfully complete a six-week field training encampment during the summer before the start of the junior year. Prospective two-year program members should contact the University AFROTC detachment no later than December of the sophomore year.

Two scholarship programs are available. High school seniors may apply for the College Scholarship Program before December 1 of their senior year through their academic advisers or a local Air Force recruiter. The Scholarship Actions Program is available to college freshmen and sophomore students. Students who attend AFROTC classes in the fall quarter of their freshman year are eligible for two- or three-year scholarships; others are eligible for two-year scholarships.

Navy Nursing Program

Michael L. McHugh, Capt., U.S. Navy, MS, *Professor and Chair,*
Department of Naval Science, Boston University

The Naval Reserve Officers' Training Corps (NROTC) Nurse program provides an opportunity for a commission as a naval officer in the Nurse Corps. Nursing students at Northeastern may enroll in the NROTC Nurse program with the Department of Naval Science at Boston University.

Nursing students wishing to contact NROTC should write to or call the office of the Commanding Officer, NROTC Unit, Boston University, 116 Bay State Road, Boston, MA 02215-1796, 617-353-2535.

NROTC has two basic programs: the scholarship program and the college program. The scholarship program provides full tuition, uniforms, books and fees, and a \$150 per month stipend for four or two years of instruction at Northeastern University. These scholarships are granted as a result of annual nationwide competition. The college program provides students with naval science texts, uniforms, and a \$150 per month stipend during the last two academic years. Scholarships may be awarded to selected applicants who have been active in the college program for at least one semester. Applications for the college program are made through the Department of Naval Science at Boston University.

A two-year program is available for sophomores or middlers who do not join NROTC by the start of their sophomore year. Both scholarship and college program options are available; selection for this program takes place in the spring, and all applications must be submitted by late February of the sophomore year.

To be eligible for the Naval ROTC program, students must meet citizenship, age, and physical fitness requirements and be enrolled in a program leading to a nursing baccalaureate degree.

The NROTC program requires completion of both the academic major, including three quarters of English composition, and the naval science curriculum; participation in leadership laboratories (two hours a week during the school year); and indoctrination tours conducted at Navy/Marine Corps facilities.

The NROTC Nurse program also requires some professional training, depending on the program and the time of entry. This training occurs during summer "cruises" of four to six weeks each for scholarship students, and one "cruise" of four to six weeks for college program students.

Upon graduation and completion of NROTC requirements, scholarship students are obligated to serve on active duty for four years, college-program students for three years.

Academic Programs and Curriculum Guide

About Sample Curricula

Each major description includes a sample of the curriculum a student might follow to meet degree requirements. These sample curricula are for general information. Course requirements, elective course distribution, and achievement levels vary from program to program, and even class to class. Consult with your academic advising office, listed below, to make certain you have all the necessary resources before planning your own curriculum.

Alternative Freshman-Year Program	249 Ryder
College of Arts and Sciences, Dean's Office	400 Meserve
Academic Program Offices	132 Nightingale
African-American Studies	
American Sign Language–	
English Interpreting	276 Holmes
Anthropology	501 Holmes
Art and Architecture	239 Ryder
Behavioral Neuroscience	125 Nightingale
Biochemistry	414 Mugar
Biology	414 Mugar
Chemistry	102 Hurtig
Communication Studies	147 Meserve
Economics	301 Lake
Education	54 Lake
English	406 Holmes
Geology/Environmental Geology	14 Holmes
History	249 Meserve
Human Services	210 Lake
International Affairs	303 Meserve
Journalism	102 Lake
Linguistics	565 Holmes
Mathematics	567 Lake
Modern Languages	360 Holmes
Music	351 Ryder
Philosophy and Religion	103 Meserve
Physics/Applied Physics	111 Dana
Political Science	303 Meserve
Psychology	125 Nightingale
Sociology	500 Holmes
Theatre	337 Ryder
Bouvé College of Pharmacy and Health Sciences	206 Mugar
College of Business Administration	250 Dodge
College of Computer Science	161 Cullinane
College of Criminal Justice	400 Churchill
College of Engineering	220 Snell
College of Nursing	102 Robinson
School of Engineering Technology	120 Snell

Special note. In assessing quarter weights for courses, one quarter-hour of credit is equal to 50 minutes of instruction per week, plus two hours of preparation.

The Office of the Registrar, 120 Hayden Hall, maintains all quarter-hour weights for courses. In the event of error in any publication, the academic record will reflect the correct quarter-hours applicable to any degree requirement.

Some course titles change, while the course number remains the same. Students must be sure not to register for a course they have already taken.

Middler-Year Writing Requirement

All middlers (that is, students who have earned 80+ quarter hours including non co-op students) must complete this graduation requirement at Northeastern. The requirement should preferably be completed before students accrue 144 quarter hours. Successful completion of Freshman English is a prerequisite to the MYWR. Students fulfill the Middler-Year Writing Requirement in one of two ways, depending on the requirements of their college: 1) complete a four quarter-hour MYWR course with a grade of C (2.0) or better; or 2) pass a one quarter-hour Writing Workshop (pass/fail). No transferred course from another university or University College may satisfy this requirement.

This University requirement is designed to help students improve their writing for major courses and in their workplaces. The eight courses are therefore interdisciplinary so that students may write in subjects related to their major. For additional information, students may contact the English department, 406 Holmes Hall, 617-373-2512.

Intermediate Writing	ENG 1350
Writing for the Professions: Business Administration	ENG 1381
Writing for the Professions: Criminal Justice	ENG 1382
Technical Writing	ENG 1125
Writing Workshop specified for major	ENG 1340
Writing for the Health Professions	ENG 1380
Advanced Writing	ENG 1352
Technical Writing 2	ENG 1370

Colleges have specific guidelines and schedules for options that apply to majors. Students should consult their dean's office or adviser for guidelines. The following colleges recommend these MYWR courses.

College of Arts and Sciences	ENG 1350
Bouvé College of Pharmacy and Health Sciences (PAH)	ENG 1350 or ENG 1340
College of Business Administration	ENG 1381
College of Computer Science	ENG 1125
College of Criminal Justice	ENG 1382
College of Engineering (ENG'G)	ENG 1125 or ENG 1340
School of Engineering Technology (ENG'G)	ENG 1340
College of Nursing	ENG 1380

Diversity Requirement

In 1995 the Student Government Association proposed to the Faculty Senate that a diversity requirement become part of the curriculum for every student at the University, and the Faculty Senate adopted this proposal. Northeastern University requires all students to complete before graduation three or more credits or to participate in a program (including but not limited to overseas co-op, study abroad, and involvement in student activities and diversity training) deemed as satisfying the diversity requirement. Each college has developed its own program to satisfy this requirement. Please consult your college for the details of its program.

The Academic Common Experience

Formally approved by the Northeastern faculty in 1995, an initiative known as the Academic Common Experience will be integrated into all programs of study over the next several years. Under the initiative, curricula will be reviewed and revised with the goal of helping all Northeastern undergraduates achieve certain skills, competencies, and understandings during their years at the University.

The Academic Common Experience encourages the development of communication skills, critical and creative thinking, information literacy, and interpersonal skills. It also emphasizes the importance of developing historical, ethical, aesthetic, and personal perspectives, and of understanding the contexts provided by the natural, social, and cultural worlds (including a multicultural understanding).

In addition, it seeks to train students to make logical connections, between theoretical and applied knowledge, for instance, or between academic study and the world of work.

A complete description of the Academic Common Experience is available through the Student Government Association.

Undergraduate Degrees

College of Arts and Sciences

Majors

Concentrations

Minors

Bachelor of Arts

Bachelor of Science

African-American Studies

Cultural Studies

Historical Studies

Social/Behavioral Studies

African-American Studies

American Sign Language– English Interpreting¹

Anthropology

Anthropology

Applied Physics¹

Art

Architecture

Graphic Design

Art

Behavioral Neuroscience

Neuroscience

Biochemistry¹

Biology

Chemistry

Chemistry

Communication Studies

Speech and Rhetoric

Organizational

Communication

Radio and Television

Communication Studies

Economics

Economics

Education (Programs)

Early Childhood Education

Elementary Education

Secondary Education

English

Creative Writing

Literature

Environmental Geology

Environmental Geology

Geology

Geology

History

History

Human Services

Human Services

Independent Studies

International Affairs

International Affairs

Journalism

Advertising

Newspaper/Print

Public Relations

Radio/Television News

Linguistics

Linguistics

Mathematics

Mathematics

Modern Languages

French

German

Italian

Russian

Spanish

French

German

Italian

Russian

Spanish

Music

Music Industry¹

Music Literature²

Music Literature and

Performance²

Music

Music Industry

Philosophy

Philosophy

Religious Studies

Physics

Physics

Political Science

Law and Legal Issues

Public Administration

Political Science

Psychology

Psychology

Sociology

Sociology

Theatre

Theatre Generalist

Production

Performance

Theatre

Interdisciplinary Minors

Asian Studies

Cinema Studies

International Affairs

Jewish Studies

*Latino, Latin American,
and Caribbean Studies*

Linguistics

Marine Studies

Media Studies

Technical Communication

Urban Studies

Women's Studies

¹Bachelor of Science only

²Bachelor of Arts only

**Bouvé College of
Pharmacy and
Health Sciences**

Associate in Science
Bachelor of Science
Doctor of Pharmacy (6-year program)

Majors
Concentrations
Minors

Athletic Training
Cardiopulmonary Sciences
 Cardiovascular Technology
 Exercise Physiology
 Respiratory Therapy

**Cardiovascular Health and
Exercise**
Medical Laboratory Science
Medical Laboratory Science

Rehabilitative Science

Additional Degrees

**Associate in Science in Dental
Hygiene**
**Bachelor of Science in Dental
Hygiene**
Bachelor of Science in Pharmacy

**Bachelor of Science in Physical
Therapy**
**Bachelor of Science in
Speech-Language Pathology and
Audiology**
Bachelor of Science in Toxicology

**College of Business
Administration**

**Bachelor of Science in
International Business**
**Bachelor of Science in
Business Administration**

Concentrations

Accounting
 Entrepreneurship and New
Venture Management
 Finance and Insurance

Human Resources
Management
 International Business
Administration
 Logistics and Transportation

Management
 Management Information
Systems
 Marketing

Minor

Business Administration

**College of Computer
Science**

Bachelor of Science
Bachelor of Arts

College of Criminal Justice**Bachelor of Science**

Concentrations

Criminology and Corrections
Legal Studies
Policing and Security

College of Engineering**Bachelor of Science****Bachelor of Science in Chemical Engineering****Bachelor of Science in Civil Engineering****Bachelor of Science in Electrical Engineering**

Concentrations

Electrical Engineering
Computer Engineering
Power Systems

Additional Degrees

Bachelor of Science in Industrial Engineering**Bachelor of Science in Mechanical Engineering****Bachelor of Science/Master of Science in Electrical Engineering****Bachelor of Science/Master of Science in Industrial Engineering****Bachelor of Science/Master of Science in Mechanical Engineering**

College of Nursing**Bachelor of Science in Nursing**

School of Engineering Technology	Bachelor of Science in Engineering Technology
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Majors

**Aerospace Maintenance
Engineering Technology**
Computer Technology
**Electrical Engineering
Technology**
**Mechanical Engineering
Technology**

Minors

Computer Technology
*Electrical Engineering
Technology*
*Mechanical Engineering
Technology*

College of Arts and Sciences

Robert P. Lowndes, PhD, *Dean*
 Timothy Donovan, PhD, *Associate Dean, External Affairs*
 Kay D. Onan, PhD, *Associate Dean, Faculty Affairs*
 Malcolm D. Hill, PhD, *Associate Dean, Undergraduate Affairs*
 Mary Mello, MA, *Director, Academic Administrative Services*
 Lisa Nefussy, MEd, *Assistant Director, Academic Administrative Services*
 Gail F. Leclerc, MEd, *Academic Adviser*
 Todd Rich, MS, *Coordinator, International Study Programs*
 Gail Stubbs, MEd, *Coordinator, Undergraduate Student Services*
 Jan Swindlehurst, MFA, *Coordinator, Undergraduate Student Services*

A broad study of disciplines in the arts and sciences is the core of higher education. Most students in the University—no matter what career training they choose—devote a substantial portion of their studies to the arts and sciences.

The college as a whole emphasizes general education through the college core curriculum. In addition, a large number of interdisciplinary and extradisciplinary programs are available. These include national and international exchange programs for study and experience; programs in field settings at sea and abroad; and programs involving affiliations in such areas as professional performing arts organizations, media organizations, and government offices.

In most programs, students may choose a four-year, full-time track or the five-year co-op plan. The five-year plan offers opportunities for paid employment, often in an area related to the student's chosen academic area. Students are normally eligible to participate in co-op when they become sophomores.

Students may enter the college with a specified major or with an unspecified liberal arts major preference (LAMP). Students in the LAMP program, however, must declare a major by the end of the freshman year. Considerable flexibility exists, and many students change majors during the first two years. The college offers a Bachelor of Arts degree and a Bachelor of Science degree in most programs. In general, the Bachelor of Arts degree requires more college core curriculum courses as well as a foreign language or American Sign Language. The Bachelor of Science degree requires fewer core curriculum courses but more work in the specific majors.

Many programs are flexible enough to allow students to pursue a double major. Students who pursue a double major are allowed unlimited double counting between their major and core curriculum courses, and students whose double major involves a BA and BS degree or two BA degrees may do the BS version of the core curriculum but must still complete the foreign language requirement.

The college also offers the option of an independent major for students whose interests and goals are not met by a specific major program. Interested students should consult an adviser in the dean's office after their sophomore year.

Class Entrance Requirements

In order to make normal progress, students in the College of Arts and Sciences are expected to maintain a minimum cumulative quality-point average of 2.0 and to earn 16 quarter hours of credit each quarter. Some majors have additional requirements in order to progress from year to year. For further details, refer to the *College of Arts and Sciences Guidebook* available from the dean's office, 400 Meserve Hall.

Graduation Requirements

Quantitative. Candidates for either the Bachelor of Arts (BA) or Bachelor of Science (BS) degree must successfully complete a minimum of 176 quarter hours. In addition, a combination of no more than 4 quarter hours of (1 or 2 credit) physical education activity courses or ROTC credits may be used to meet this requirement.

Residency. Candidates must complete either 75 percent of the degree credit (132 quarter hours) or the last three full quarters (a minimum of 12 four-credit courses) in the Northeastern University Basic Day Colleges.

Qualitative. Candidates must achieve a minimum cumulative average of 2.0 (grade of C).

Transfer credit. Transfer credit is granted initially for courses that fulfill major, college, or elective requirements in an arts and sciences program. Courses must be from an accredited college or university and credit will be granted only for courses in which the student earned a grade of at least C (2.0). Courses taken pass/fail are not eligible for transfer credit. To receive credit for courses in progress at the time of application, the student must submit an updated official transcript for review. Students should contact a major or dean's office adviser prior to enrollment to have transfer

credits evaluated, both for major and college requirements. Students who believe that they should be granted additional transfer credit should consult with an academic adviser in the College of Arts and Sciences dean's office, 400 Meserve Hall.

Core curriculum. The College of Arts and Sciences core curriculum is required of all students. The core curriculum is a set of requirements intended to provide students with the opportunity to gain the broad base of knowledge traditionally associated with a liberal arts education. The core allows students to develop proficiency in basic skills; to be exposed to methods of inquiry in the various subjects and disciplines in the arts and humanities, the social sciences, and the natural sciences and mathematics; and to become acquainted with ideas in Western culture, differing views in non-Western cultures, and major issues and problems facing contemporary society.

The core curriculum consists of six categories:

Category I Basic Skills

- Freshman English (two or three courses depending on placement level upon entry to the University)
- College mathematics (one to three courses depending on placement level upon entry to the University)
- Modern language or American Sign Language through Intermediate 2 level (required of all Bachelor of Arts candidates)

Category II Methods of Inquiry

Category III The Western Cultural Heritage

Category IV Alternative Cultures and Societies

Category V Theoretical Perspectives and Changes

Category VI Current Issues in Perspective

For placement information on freshman English, college mathematics, or modern languages, students should consult the appropriate department or the Office of the Dean, 400 Meserve Hall.

Descriptions for all College of Arts and Sciences courses begin on page 120. Courses approved for the college's core curriculum have Roman numerals in parentheses at the end of the descriptions to indicate the appropriate core curriculum categories for each core course. Students are required to complete courses in each category of the core, depending on the major and degree pursued. The *College of Arts and Sciences Guidebook*, available in the Office of the Dean, 400 Meserve Hall, provides a list of courses that may be used to fulfill each category requirement and more specific details on the core curriculum.

Experiential Education Requirement. All Arts and Sciences students are required to fulfill an experiential education requirement. The experiential education requirement has a learn-by-doing aspect and may be satisfied in a number of ways (e.g., academic internships; fieldwork or practica; international study programs; theses or special projects; some off-campus courses or programs; community service projects; participation in co-op followed by a course designed to help students link co-op with an academic discipline; and others). The experiential education requirement should be fulfilled when students are upperclassmen. More detailed information on the experiential education requirement for each major should be available in the major departments, as well as in the *College of Arts and Sciences Guidebook*.

Foreign language. All Bachelor of Arts degree candidates must show proficiency in a modern foreign language or American Sign Language by earning a passing grade in Intermediate 2 level of a college course or by meeting a comparable criterion approved by the Department of Modern Languages.

Conditional exemption from this requirement may be granted to students who earned an average of C or better in a full, four-year language sequence in secondary school. A conditional exemption must be confirmed by taking a proficiency examination during the first quarter at the University. A sufficiently high score will verify the exemption; otherwise, the student will be advised of the appropriate language course to take in the following quarter.

Absolute exemption is granted to students for whom English is a foreign language or who receive a score of 550 or better in the Language Achievement Examinations.

The normal sequence for students with no prior preparation is two quarters of elementary-level language and two quarters of intermediate-level language. The Department of Modern Languages will determine an appropriate entry point at which students who have partial language preparation may begin completing the requirement. Students who plan to use German, Russian or Italian to fulfill the foreign language requirement should begin study as early as possible; the college is not able to offer these courses on a regular basis.

Middler-year writing requirement. The middler-year writing requirement (MYWR) may not be fulfilled until the student has successfully completed at least 80 quarter hours (including transfer credit) and should preferably be completed before 144 quarter hours. The requirement must be ful-

filled in the full-time day programs at Northeastern. The College of Arts and Sciences strongly recommends intermediate writing (ENG 1350) to complete the MYWR. Students may, however, also satisfy the requirement by completing a four-credit writing course from the approved MYWR list (found in the *College of Arts and Sciences Guidebook*) with a grade of C or better or, with special permission, a one-credit writing workshop (ENG 1340). Students not participating in the cooperative education program should complete the MYWR in their junior year.

Interdisciplinary Minors

Minor in Asian Studies Curriculum

Students may choose a concentration in Middle Eastern studies or East Asian studies (China, Japan, Korea). Courses cover a range of academic disciplines including anthropology, history, music, philosophy and religion, sociology, language, and political science. In each concentration, three core courses and four electives are required.

Concentration in Middle Eastern studies. HST 1612, The Modern Middle East; PHL 1280, Islam; and POL 1345, Government and Politics in the Middle East. Choose four electives: ECN 1332, Economic History of Less Developed Countries; HST 1613, Contemporary Middle East; HST 1614, The Middle East Today in Fact, Fiction, and Film; HST 1652, Islam Resurgent; MUS 1182, Music of the Middle East; and POL 1384, Arab-Israeli Conflict.

Concentration in East Asian studies. HST 1637, Modern Japan; PHL 1275, Eastern Religions; and POL 1371, Government and Politics of China. Choose four electives: HST 1150, Introduction to Third World History; HST 1633, Modern China; HST 1634, Contemporary China; POL 1332, Government and Politics of Japan; HST 1641, Recent Leaders of Asia; PHL 1130, Ethics: East and West; PHL 1255, Indian Philosophy; PHL 1250, Chinese Philosophy; PHL 1293, Mysticism: East and West; POL 1372, China's Foreign Relations; and SOC 1104, Contemporary Japanese Culture and Society.

For both concentrations, it is strongly recommended that students gain proficiency in an Asian language. Chinese courses are currently taught in the program.

Minor in Cinema Studies

The minor in cinema studies helps students acquire skill in analyzing one of the major art forms and cultural influences of the twentieth century. It also provides critical tools that can be used to study the relationships between film and society, history, aesthetics, performance, philosophy, and psychoanalysis. Students take eight courses: two required courses, a video production requirement, and five electives. The interdisciplinary curriculum draws from courses in several departments.

Required courses. INT 1320, Exploring the Humanities through Film, or LNF 1550, Introductory Film Analysis; LNF 1551, Film Theory; and one of the following: ART 1171, Animation Workshop; ART 1180, Video Basics; or CMN 1450, Television Studio Production. **Choose five electives:** AFR 1133, History of Blacks in the Media and the Press; ART 1233, Contemporary Directions in Cinema; ART 1235, History of Film; ART 1236, The American Film; ART 1238, Documentary Film; ART 1281, Video Project; CMN 1451, Foundations of Broadcast Technology; CMN 1454, Programming for Radio and Television; CMN 1455, Television Field Production; CMN 1554, Special Topics in Media (when appropriate); CMN 1620, Television Criticism; ENG 1288, Film and Text; ENG 1289, Shakespeare on Film; ENG 1290, Topics in Film (may not be counted more than twice); ENG 1291, Popular Culture; ENG 1294, Modern Film; ENG 1295, American Film and Society; ENG 1297, Approaches to Film; HST 1494, History and Film; HST 1575, History of Media in America; HST 1591, American Images of China; INT 1320, Exploring the Humanities through Film; INT 1321, Modernism; LNF 1521, French Film and Culture; LNF 1560, Film and Psychoanalysis; LNG 1554, Modern German Film and Literature; LNS 1550, Spanish Civil War in Spanish Film; MUS 1139, Film Music; SOA 1120, Camera on Culture: Visual Anthropology; THE 1316, Acting for the Camera; THE 1849, Special Topics.

For more information, contact the director of cinema studies, Professor Inez Hedges (21 Dockser), at 617-373-5163.

Minor in International Affairs

The minor in International Affairs provides students with the opportunity to develop a greater awareness and understanding of both regional and global issues. It seeks to better prepare students for the interdependent world in which they will live, work, compete, and cooperate upon graduation.

Students take seven courses, plus fulfill an International Experience. Foreign language proficiency is not required but strongly recommended, and students are also advised to undertake foreign language study while abroad during fulfillment of their International Experience as appropriate.

IAF 1100, Introduction to International Affairs; IAF 1500, Senior Seminar in International Affairs; five electives chosen from categories of *Regional Analysis* and *Global Dynamic and Development* and to be distributed as described (see below). International Experience, fulfilled by choosing one from among four options: (a) study abroad, through enrollment in one of the Northeastern

University study abroad programs, or, with prior approval, through another university; a minimum of one term is required, with two terms encouraged; a maximum of two courses taken as part of study abroad may be counted in fulfilling the number of electives, and these courses must fall within the proper elective categories; (b) internship abroad, which the student may develop or which may be sponsored by a major department or CAS International Study Programs Office; the internship may carry academic credit (with departmental approval); (c) international coop, arranged through the Division of Cooperative Education; or (d) directed study on campus (when the foregoing are not feasible), to be supervised by faculty specialized in a specific country or region of the student's interest; a minimum of 8 credits is required.

Elective categories. A total of five elective courses is required from the dual categories of *Regional Analysis* and *Global Dynamics and Development*, as listed below. Students must take at least two courses from each category.

Regional Analysis. Students must select two or three courses from this category and these courses must be chosen from at least two different regional subcategories.

Africa: AFR 1197, Modern African Civilization†; AFR 1156/MUS 1181, Music of Africa; AFR 1191/HST 1620, Early African Civilization†; AFR 1193, Africa Today; AFR 1195, Identity and Nationalism in Africa; AFR 1197/HST 1621, Modern African Civilization†; AFR 1342/POL 1342, Crisis and Conflict in Black Africa†; AFR 1403/HST 1623, History of West Africa†; and AFR 1405/ HST 1625, South African History.†

Asia: HST 1581, American Images of China; HST 1610, Topics in Asian History†; HST 1633, Modern China†; HST 1634, Contemporary China; HST 1637, Modern Japan†; MUS 1183, Music of East Asia†; PHL 1250, Chinese Philosophy; PHL 1255, Indian Philosophy; PHL 1275, Eastern Religions†; PHL 1293, Eastern and Nontraditional Philosophy; POL 1332, Government and Politics of Japan†; POL 1371, Government and Politics of China†; SOC 1104, Sociology of Japan.†

Europe: ART 1204, Renaissance Architecture†; ART 1205, Renaissance Art†; ECN 1333, European Economic Development; ENG 1652, Twentieth Century English Literature; HST 1301, Topics in European History; HST 1390, Population in European History; HST 1473, Women in Modern Europe†; HST 1481, The Culture of Europe; INT 1321, Modernism; LNF 1521, French Film and Society†; LNG 1554, Modern German Film and Literature†; LNS 1550, Spanish Civil War in Spanish Film†; POL 1306, Politics in Western Europe†; POL 1340, Crisis and Change in Central/Eastern Europe†; POL 1343, Politics and Violence in Northern Ireland†; POL 1347, Russian Politics After Communism†; SOC 1105, Society and Culture in Russia and the Former Soviet Union.†

Latin America: AFR 1196, The Black Experience in the Caribbean; HST 1604, Modern Latin America†; HST 1605, The Modern Caribbean†; INT 1121, Introduction to Latino, Latin American, and Caribbean Studies; LNS 1501, Backgrounds of Latin American Culture†; LNS 1511, Introduction to Caribbean Literature†; MUS 1184, Music of South America, Latin America, and the Caribbean†; POL 1368, Government and Politics of Latin America†; SOA 1430, Latin American Society and Development.

Middle East: HST 1612, The Modern Middle East†; HST 1613, The Contemporary Middle East; HST 1614, The Middle East Today in Fact, Fiction, and Film; MUS 1182, Music of the Middle East; PHL 1285, Introduction to Jewish Religion and Culture; POL 1345, Government and Politics in the Middle East†; POL 1346, Gender in the Middle East.†

Global Dynamics and Development. Students must choose at least two courses from this category:

AFR 1294, Third World Political Relations; ECN 1150, Economics of World Energy and Primary Resources; ECN 1330, Development Economics†; ECN 1335, International Economics: Finance†; ECN 1336, International Economics: Trade†; HST 1644, Third World Women; HST 1652, Islam Resurgent; INB 1338, Introduction to International Business†; INB 1731, Cultural Aspects of International Business†; INB 1735, Import and Export Management†; PHL 1130, Ethics East and West†; PHL 1137, Philosophical Problems of War and Peace; PHL 1280, Islam†; POL 1112, Introduction to International Relations†; POL 1113, Introduction to Foreign Governments†; POL 1309, International Political Economy†; POL 1313, International Organization†; POL 1337, U.S. Foreign Policy†; POL 1338, Religion and Politics; POL 1369, Political Violence; POL 1384, Arab-Israeli Conflict†; POL 1386, International Law; POL 1411, Seminar in International Relations; SOA 1104, Cultures of the World†; SOA 1120, Camera on Culture; SOA 1310, Global Markets and Local Cultures; SOA 1430, Latin American Society and Development†; SOC 1171, Race and Ethnic Relations: A World Perspective.

†This course is expected to be offered annually.

Minor in Jewish Studies

The minor in Jewish studies provides students the opportunity to undertake the study of Jewish religion, culture, and history at Northeastern or in combination with courses at Hebrew College in Brookline, Massachusetts, and courses under the study abroad program. Students take seven courses. A minimum of four courses must be taken at Northeastern.

All students must take PHL 1285, Introduction to Jewish Religion and Culture, and a senior-level directed study or seminar that involves a major research project.

Additional courses at Northeastern. HST 1539, American Jewish History; POL 1384, The Arab-Israeli Conflict; PHL 1315, Understanding the Bible; ENG 1558, Jewish Themes in Literature (Literature in Context); MUS 1185, Music of the Jewish People; SOC 1350, Jewish Women in U.S. Culture; and up to two of the following courses: ED 1423, Ethnic and Multicultural Education; PHL 1110, Introduction to Religion, or SOC 1470, Sociology of Religion; SOC 1140, The Sociology of Prejudice.

Students may petition the Jewish studies coordinator to gain Jewish studies credit for any courses not on this list for which they do substantial work in Jewish studies.

Courses at Hebrew College. Students take courses approved by the coordinator of Jewish studies at Northeastern. Students should contact the University registrar, Dean Edmund Mullen, for more information about enrolling at Hebrew College.

Study abroad. Students take courses at Hebrew University, Tel Aviv University, or Ben Gurion University under the study abroad program. Courses must be approved by the coordinator of Jewish studies at Northeastern.

For more information contact the Jewish studies coordinator, Professor James Ross, at 617-373-4050.

Minor in Latino, Latin American, and Caribbean Studies

This minor offers students an interdisciplinary program drawn from six academic departments (African-American Studies, History, Music, Political Science, Modern Languages, and Sociology/Anthropology). Latin American Studies combines historical, social-scientific, ecological, and cultural-aesthetic approaches to the study of Latin American society. Latino studies explores the large, long-standing, and growing Latin American presence in communities outside Latin America, especially in North America. The minor helps students prepare for more specialized work in fields such as business, social services, diplomacy, health, law, education, and international relations with Latin American and Latino populations both in the United States and abroad.

The minor includes a strong link to the co-op program, to community-based internships, and to study abroad programs. It is strongly recommended that students pursuing the minor achieve proficiency in Spanish. Students take six required courses and either complete an internship or co-op experience in a community-based agency or participate in a study abroad program. All students must take INT 1121, Introduction to Latino, Latin American and Caribbean Studies; one course in history; one course in language, literature, and music; one course in social science; and two comparative courses that include Latin American, Caribbean, or U.S. Latino populations. Students should consult with the academic adviser for the minor to make final determination of courses included.

History: AFR/HST 1196, The Black Experience in the Caribbean; HST 1538, Latinos in the U.S.; HST 1604, Modern Latin America; HST 1605, The Modern Caribbean; HST ____, U.S. History from a Latino Perspective.

Humanities, language, and literature: LNS 1315, Latin American Literature (Colonial, 19th Century); LNS 1316, Latin American Literature (20th Century); LNS 1500, Backgrounds in Hispanic Culture; LNS 1501, Backgrounds in Latin American Culture; LNS 1511, Introduction to Caribbean Literature; MUS 1184, Music of Latin America and the Caribbean; and new courses added in this area.

Social science: POL 1368, Government and Politics of Latin America; SOA/INT 1133, The Americas from an Indigenous Perspective; SOA 1430, Latin American Society and Development; SOC 1221, The Sociology of Latino Migration; SOC 1460, Sociology of Latino Society; and new courses added in this area.

Comparative Studies (courses that include components of Latino, Latin American and Caribbean societies and compare them to other societies): AFR 1151, African-American Art History; AFR 1155, Foundations of Black Culture; AFR 1294, Third World Political Relations; POL 1316, Contemporary Revolutionary Politics; POL 1386, International Law; SOA 1100, Peoples and Cultures; SOA 1104, Cultures of the World; SOA 1146, Rural Workers in the Third World; SOC 1146, Environment and Society; SOC 1170, Race and Ethnic Relations; SOC 1171, Race and Ethnic Relations: A World Perspective; SOC 1255, Sport in Society; SOC 1455, Sport and Culture; THE 1847, Images of Afro-American and Latina Women in Film; and new courses added in this area.

Minor in Linguistics Curriculum

Seven departments (African-American Studies, American Sign Language, English, Modern Languages, Philosophy and Religion, Psychology, Sociology/Anthropology) collaborate to offer the Minor in Linguistics. Courses are cross-listed and can be taken under either prefix.

LIN 1118, Introduction to Language and Linguistics I; LIN 1218, Introduction to Language and Linguistics 2; one of the following: LIN 1220, Introduction to Phonetics and Phonology; LIN 1262, Psychology of Language; LIN 1401, Introduction to Syntax.

Three courses, not already taken, from the following: LIN 1119, History of the English Language; LIN 1215, Symbolic Logic; LIN 1220, Introduction to Phonetics and Phonology; LIN 1231, African-American English; LIN 1235, Applied Linguistics; LIN 1236, Advanced Applied Linguistics; LIN 1240, Bilingualism; LIN 1245, History of the French Language; LIN 1250, Linguistics of American Sign Language; LIN 1255, History of the Spanish Language; LIN 1260, Introduction to Romance Linguistics; LIN 1262, Psychology of Language; LIN 1263, Nonverbal Communication; LIN 1335, Language and Culture; LIN 1362, Child Language; LIN 1364, Cognition; LIN 1365, Language and the Brain; LIN 1401, Introduction to Syntax; LIN 1402, Grammars of English; LIN 1407, Semantics; LIN 1408, Topics in Linguistics; LIN 1415, African Languages; LIN 1440, Philosophy of Language; LIN 1562, Laboratory in Psycholinguistics; LIN 1564, Laboratory in Cognition; LIN 1661, Seminar in Psycholinguistics; LIN 1662, Seminar in Cognition; LIN 1692, Seminar in Linguistics; LIN 1693, Seminar in Linguistics; and LIN 1804, Directed Study.

For more information, contact Professors Lynn Stephen, 617-373-4274, Neil Larsen, 617-373-2237, or the Latino, Latin American, and Caribbean Studies Office in 570 Holmes Hall, 617-373-3956.

Minor in Marine Studies Curriculum

The marine studies minor allows students from all majors to explore the marine environment. Students may focus on either the scientific or social science/humanistic approach to studying the ocean. The program is designed to develop specific marine-related skills and requires completion of an independent study. Students are encouraged to participate in marine field courses such as Northeastern's East-West Program, which focuses on biological research, or the SeaSemester Program, which includes sail-training on a tall ship.

For more information contact Professor Peter Rosen, marine studies coordinator, 617-373-3176.

Minor in Media Studies Curriculum

The media studies minor is intended for students who seek an intense education in the field of mass communication through an exposure to coursework in a number of academic disciplines.

Coursework includes theory, criticism, and projection. The minor may be taken as a complement to a major in any department or college at the University. Individual programs may be developed with the approval of the chair of the Department of Communication Studies or the director of the School of Journalism. Consult your adviser to determine the course of study most appropriate for your educational goals. Students must complete four courses from the following list to fulfill the minor: CMN 1250, Introduction to Mass Communication; CMN 1450, Television Production*; CMN 1451, Foundations of Broadcast Technology*; HST 1575, History of Media in America; JRN 1512, Journalism Ethics and Issues. In addition, students must complete four other courses, including one course from each area of the following: **technical/production**: ART 1281, Video Basics; CMN 1452, Radio Production*; CMN 1455, Television Field Production; JRN 1421, Television News Writing; JRN 1422, Television News Production; **management**: CMN 1453, Broadcast Management*; CMN 1454, Programming for Radio and Television*; JRN 1508, Law of the Press; **criticism**: CMN 1317, The Audience in Mass Communication*; CMN 1620, Television Criticism*; HST 1494, History and Film; INT 1320, Exploring the Humanities through Film. Special Topics courses may apply to the minor when the topics are focused on media. They may be used to fulfill any of the above elective areas. For further information about the program, contact Professor Nicholas Daniloff, 102 Lake Hall, or Dr. Richard Katula, 145 Meserve Hall.

Minor in Technical Communication Curriculum

Technical communication combines written, oral, and graphics skills with a background in science or technology. The minor in technical communication prepares students for careers as technical writers, or for careers in which technical communication is a significant part of the job. Students in English or other liberal arts studies may elect the minor, as may students from a variety of technological or scientific fields. A student does not have to be enrolled in the College of Arts and Sciences to declare the minor.

Eight courses are required: ENG 1125, Technical Writing; ENG 1370, Technical Writing 2 *or* ENG 1371, Writing for the Computer Industry; ENG 1352, Advanced Writing *or* ENG 1380, Writing for the Professions: Health Services *or* ENG 1381, Writing for the Professions: Business Administration; CMN 1116, Public Speaking *or* CMN 1331, Advanced Interpersonal Communication; JRN 1440, Design and Graphics (or an equivalent in another department or college); COM 1101 Algorithms and Data Structures 1; and two of the following, preferably both within the same discipline: BIO 1106, General Biology; BIO 1107, Animal Biology; CHM 1111, General Chemistry 1; CHM 1112, General

*Some courses require prerequisite courses or permission of instructor.

Geology; IIS 1125, COBOL Programming 1; PHY 1221, Physics for Science and Engineering Students 1; PHY 1222, Physics for Science and Engineering Students 2; PHY 1223, Physics for Science and Engineering Students 3.

Minor in Urban Studies Curriculum

Students must take seven courses. SOC 1147, Cities and Society; POL 1324, Urban Politics; ECN 1320, Urban Economics; and one course from each of the following areas:

Urban problems and policies: SOC 1346, Suburb and Metropolis; POL 1308, Politics of Poverty; POL 1318, State and Local Government; ECN 1321, Urban Economic Problems and Policies.

Urban humanities: HST 1391, European Urban History to 1850; HST 1543, American Urban History; ENG 1608, The City in Literature.

Urban form and design: ART 1111, Introduction to Architecture; ART 1226, Modern Architecture: The Twentieth Century; ART 1150, Architectural Design 1.

African-American studies: AFR 1261, Economics of Urban Poverty; AFR 1275, Urban Political Issues; AFR 1475, Public Policy Analysis.

To obtain credit for the minor, students must file a petition form with the College of Arts and Sciences. Interested students should confer with an adviser as soon as possible. Advisers are Professor John Portz, political science, 303 Meserve Hall, 617-373-2796; Professor George Thrush, art and architecture, 309 Ryder Hall, 617-373-2083; Professor Gregory Wassall, economics, 317 Lake Hall, 617-373-2196.

Minor in Women's Studies Curriculum

The Women's Studies program offers students an opportunity to work with respected scholars in a variety of disciplines to examine the human experience through the perspectives of women. This interdisciplinary program examines the importance of gender in societies around the world, past and present. The curriculum encourages students to learn and think about how changing beliefs about women and men have affected research and scholarship in the arts, humanities, and social and natural sciences. Students learn about gender stereotypes, the various ways ideas about gender and sexuality gender roles have developed, and the changing situation for women and men today. Key questions are posed that change how people see the world: How does gender influence the kinds of questions we can ask of the world around us? What information can become data when you use gender as a central part of examining a problem? The Women's Studies program coordinates the Boston Area Colloquium on Feminist Theory lecture series, sponsors talks by scholars on campus, produces the Working Papers in Gender Studies Series, and sponsors the Visiting Research Scholars in Women's Studies series. Women's Studies also works closely with the independent, student-run Women's Center to sponsor programs for Women's History Month and other events of special concern to women students.

To minor in Women's Studies, students take a total of seven courses: SOC 1150 *or* INT 1150, Introduction to Women's Studies; SOC 1302 *or* INT 1302, Feminist Perspectives on Society; and five electives.

Undergraduate elective courses. AFR 1241, Black Family; AFR 1121, African American Literature 1; AFR 1133, History of Blacks in Media Press; AFR 1251, Survey of Black Drama; AFR 1442, African American Women; CJ 1616, Women and the Criminal Justice System; CMN 1232, Gender and Communication; ECN 1312, Women in the Labor Market; ENG 1551, Gender Roles in Literature; ENG 1600, Topics in Literature (when gender related); ENG 1602, Major Figure (when gender related); ENG 1678, Early African American Literature; HST 1472, The Family in European History; HST 1473, Women in Modern Europe; HST 1554, Women in America; HST 1644, Third World Women; LNF 1560, Film and Psychoanalysis; LNS 1306, Spanish Golden Age Theatre; LNS 1500, Backgrounds of Spanish Culture; LNS 1510, Saints and Sinners; MUS 1106, Women in Music; MUS 1800, Directed Study (when gender related); NUR 1303, Life Crisis: Analysis and Response; NUR 1606, Women's Health Choices; PHL 1295, Medicine, Religion, and the Healer's Art; POL 1327, Sex Roles in American Politics; POL 1328, Women in Public Management; POL 1346, Gender and Politics in the Middle East; PSY 1218, Psychology of Women; SOA 1100, Peoples and Cultures; SOA 1146, Rural Workers in the Third World; SOA 1160, Sex, Sex Roles, and the Family; SOA 1301, Human Origins; SOA 1303, Sexuality and Culture; SOA 1430, Latin American Society and Development; SOC 1155, Sociology of the Family; SOC 1160, Sex-Gender Roles in a Changing Society; SOC 1177, Social Roles in the Business World; SOC 1178, Women Working; SOC 1217, Women, Health, and Social Change; and SOC 1350, Jewish Women in U.S. Culture. New courses are being developed.

Undergraduate students who want to integrate their interest in women's studies with a major discipline can consult with the Women's Studies coordinator to develop an interdisciplinary major, the arts and sciences college "independent major."

Graduate students interested in women's studies should note that, pending approval, a non-degree Graduate Certificate in Women's Studies may be available soon. Currently, graduate students in the sociology and anthropology department can develop a specialization in gender. A range of departments and colleges offer graduate courses in gender.

Graduate elective courses. CJ 3515, Gender and Justice: Women, Crime, and the Law; CRS 3356, Seminar in Feminist Theory; CRS 3384, Human Sexuality; ENG 3315, Contemporary Critical Theory; ENG 3317, Topics in Criticism: Feminist Literary Theory; ENG 3333, Major Figures in African American Literature; Topics in Literature courses accepted when focused on women; ENG 3403, Topics in Linguistics: Language, Gender, and Power; HST 3361, European Women's History; HST 3370, Seminar in History of the Family; HST 3398, Seminar in Feminist Theory and Historical Inquiry; HST 3399, Seminar in Approaches to Women's History; POL 3665, Women in Public Management; POL 3667, Equal Opportunity in Public Administration; SOA 3102, Class and State Formation; SOA 3103, Gender, Sexuality, and Culture; SOA 3156, Gender, Kinship, and Social Change; SOC 3155, The Family; SOC 3160, Women, Men, and Social Change; SOC 3175, Sociology of Work; SOC 3302, Feminist Methodologies; SOC 3304, Feminist Theory; SOC 3319, Contemporary Religious Identity: A Feminist Focus; SOC 3365, Social Movements; SOC 3412, Contemporary Issues in Sociology when gender oriented; and NUR 1606, Women's Health: Choices and Decision. New courses are being developed and added.

These are only some of the courses offered. New courses are continually being developed and added to the program. For more information and the most recent brochure describing the Women's Studies Program, contact Professor Christine Gailey at 617-373-4991 or Ms. Audrey Aduama at 617-373-4984.

Special Programs

Additional information is available from involved departments and the Office of the Dean, 400 Meserve Hall.

The availability of all special programs is contingent on meeting minimum enrollment numbers and, when an outside institution is involved, continued affiliation of that institution with the University. Overseas study programs are open to qualified middlers, juniors, and seniors with a cumulative quality-point average of 3.0 or higher.

Independent Major

An eligible student may petition the College Curriculum Committee to meet requirements for a degree in an independent major. Eligibility, procedures, and requirements must be discussed in advance with an adviser in the Office of the Dean. No student may be considered for an independent major until a curriculum proposal has been submitted to, and approved by, the College Curriculum Committee.

Combined Program with Professional Schools

In the combined program, a preprofessional student may reduce by one year the time normally required for obtaining both the undergraduate and professional degrees. Students who have completed at least three-fourths of the work required for a baccalaureate degree in the College of Arts and Sciences and who are accepted into an approved professional school of dentistry, law, medicine, optometry, osteopathy, or veterinary medicine will be eligible for the Bachelor of Arts or Bachelor of Science degree at the end of their second year in a professional school. At least two-thirds of the work for the baccalaureate degree must be earned in residence at Northeastern, and all other College of Arts and Sciences requirements must be fulfilled. The residence requirement must be completed prior to entering the professional school.

Bachelor of Arts or Bachelor of Science/Juris Doctor Degree Program

Northeastern offers an eight-year joint degree program for aspiring lawyers. Each year a limited number of highly qualified freshmen are admitted to the five-year undergraduate portion of the program.

To continue into the law school portion of the program, students must graduate in the top 15 percent of their class and score in the top 20 percent of the Law School Aptitude Test (LSAT). Students who meet these criteria will be qualified to continue their studies at Northeastern University School of Law.

Bachelor of Arts or Bachelor of Science/Master of Business Administration Program

A limited number of students may combine an initial period of undergraduate study in the College of Arts and Sciences with graduate study in the College of Business Administration, enabling students to earn both the Bachelor of Arts or Bachelor of Science and the Master of Business Administration degrees including one year of co-op work experience (six months undergraduate and six months graduate) in a five- or six-year period.

In the first three years, students complete nine academic quarters of arts and sciences courses with two quarters of cooperative education. After taking the GMAT and being accepted into the College of Business Administration in the third year, students spend their fourth year completing requirements in their undergraduate major and beginning graduate coursework in the Cooperative Education MBA Program. Depending on the undergraduate major, twelve credits of undergraduate study may be applied toward the MBA or twelve credits of MBA study may be applied toward the bachelor's degree. Students may begin the Cooperative education MBA portion of study in January or June.

Interested students should contact the College of Arts and Sciences dean's office in 400 Meserve Hall or the College of Business Administration's graduate school in 350 Dodge Hall.

Northeastern University–Hebrew College Exchange

This program offers students the opportunity to register for courses in specialized areas of Jewish studies and Jewish education. See page 34, Minor in Jewish Studies, or contact the University registrar, Dean Edmund Mullen, 120 Hayden Hall, 617-373-2183, for more information on the registration process for this exchange program.

Foreign Languages

Business German. Students may use this course as a prerequisite to conversational German courses to prepare for a business-oriented co-op in Germany. This course, taught in English, is designed for students of business and economics seeking competence in reading and understanding texts produced by the German business community and trade media. Additional information may be obtained from Professor Ross Hall in the Department of Modern Languages, 360 Holmes Hall, 617-373-2234.

Elementary Spanish for criminal justice or human services majors. This course is intended for students who will need to use Spanish in police work and in social service settings. The grammar component is the same as that in other elementary Spanish courses. The vocabulary is adapted to particular needs and interests of the students. Students use role-playing extensively and practice “intake” interviews.

French for business and economics students. Designed for students interested in international business, the program offers a thorough study of grammar, insights into the French way of life, specialized vocabulary related to the business world, and an introduction to French business texts. The course is a preliminary step for the student wishing co-op placement in France. Additional information may be obtained from Juliette Gilman, 362 Holmes Hall, 617-373-3659.

Marine Science

East/West Marine Biology Program. The East/West Marine Biology Program allows advanced undergraduate and beginning graduate students in biology and related areas to spend a year of field study in three diverse marine environments.

The program begins in the fall at the University of Washington’s Friday Harbor Laboratories, on San Juan Island. In January, students travel to Jamaica to study tropical biology at the Discovery Bay Marine Laboratory on the island’s north coast. The final phase of the program is conducted at Northeastern’s Marine Science Center in Nahant, Massachusetts. For more information, contact Sara Jordan at 617-595-5597.

Marine Science Center Summer Program in Marine Biology. The summer program allows students to participate in intensive courses at the Marine Science Center (MSC). Students conduct independent research at the MSC laboratory throughout the year. Graduate students from other universities are encouraged to use the laboratory and field sites for thesis research.

Massachusetts Bay Marine Studies Consortium. Northeastern University is a member of the Massachusetts Bay Marine Studies Consortium. The consortium’s offerings are interdisciplinary and seek to bridge academic disciplines and current concerns in the marine world. The consortium serves the students and faculty of twenty-two Boston-area colleges and universities. Students from Northeastern may take these classes, which are taught by specialists and government officials. For more information, contact Professor Peter S. Rosen, Department of Geology, 617-373-4380.

The Center for the Arts

The primary mission of the Center for the Arts is to support and develop the arts as a vital and integral component of the Northeastern community. Through a variety of mainstage and artist-in-residency programs, featuring performing and visual artists acclaimed for their excellence, the center complements the academic arts departments in their effort to educate Northeastern students in becoming knowledgeable, discriminating, and active participants in the arts. In addition, the center supports curriculum-oriented arts projects and events, encourages interdepartmental collaborations, develops exhibitions and presentations that serve the on-campus community as well as the general public, provides multicultural arts programs, and acts as a primary facilitator for research in the arts.

The center also manages the Blackman Auditorium Theatre Complex and operates the Northeastern University Ticket Center. Tickets to and information about performing and visual arts events and other campus events are available in the ticket center as are tickets and passes to Boston area dance, music, theatre, film, and visual arts events. The ticket center also provides free passes and maintains a University membership to the Museum of Fine Arts that entitles all undergraduate students in the full-time day programs to free membership privileges.

For information on arts activities, please call the Center for the Arts office at 617-373-2249. For ticket information, call the ticket center at 617-373-2247.

Study Abroad

The College of Arts and Sciences strongly endorses the importance of an international experience as a dimension of learning. To foster this, it maintains an Office of International Study Programs that has developed a series of programs tailored to the interests and needs of Northeastern University students.

Students who wish to pursue a particular program sponsored by Northeastern University or another institution should arrange to discuss the program in which they are interested with the Coordinator of International Study Programs, 400 Meserve, (617) 373-5162, and with one of the academic advisers in the Dean's Office to ensure that credits granted through study abroad will be applicable to their program in the college. Students who participate in Northeastern-sponsored study abroad programs maintain their full-time Northeastern status, and their grades will be calculated into their QPA.

The general requirements for participation in all Northeastern University study abroad programs are: middler-year standing or above, and QPA of 3.0 or higher. The Office of International Study Programs maintains a rolling admission policy for most programs; early application is advised.

African Studies at the University of Ghana. Recommended for the fall quarter, this program offers students an opportunity to learn about West African history, politics, music, literature, and culture. Students are required to take a Twi language course and a Ghanaian or African studies course.

Australia. This program offers students an opportunity to study at universities in Melbourne, Sydney, or Perth. Courses are offered in a variety of arts and sciences disciplines. Students live and study with Australians, as well as with international students from around the world.

Eastern European Studies Program in Prague. This program offers students a variety of courses in the arts and sciences at Charles University. The primary focus will be on the history, politics, literature, and culture of the Czech republic. Courses are taught in English, but all students will receive intensive instruction in the Czech language as well. This program is recommended for the fall quarter.

European Studies Internship Program. This program takes place during the winter quarter at the Irish Institute for European Affairs in Leuven, Belgium, near Brussels, and has been designed to offer students an opportunity to learn about the history, organization, and operation of the European Union. Courses are available in politics, economics, history, and other subjects. Included is participation in a research internship with the office of a member of the European Parliament.

Florence, Italy. The SACI program, located in the heart of Florence, is designed for students to study art, art history, photography, Italian literature, Italian language, and a variety of other arts and sciences disciplines. Courses taught in English are available in both introductory and advanced levels. This program is recommended for the fall quarter.

Goldsmiths' College, University of London. A wide variety of courses in art, communications, theatre, education, English, history, politics, psychology, and sociology are available to Northeastern University students through a special arrangement with the University of London. Students may participate during the fall and/or winter quarters.

Hansard Scholars Parliamentary Internship Program in London. Available during the fall or winter quarter, this program combines courses in British society and government with carefully selected internship placements, including the British parliament. Courses are taught at the London School of Economics and Political Science

Hungarian and Central European Studies in Budapest. Recommended for the fall quarter, this program allows students to see firsthand the dramatic changes occurring in Eastern Europe. The courses (taught in English) are offered mostly in the arts and sciences, but there are a variety of disciplines to choose from. The main focus is on economics, literature, history, and sociology. While taking classes at the Technical University of Budapest, students will also be encouraged to take an intensive Hungarian language class.

Ireland: North and South Internship Program. Students in this program spend two quarters in Ireland: fall at the Institute of Public Administration in Dublin, and winter at Queen's University in Belfast. Courses are available in literature, sociology, political science, history, and other subjects. The fall quarter includes an internship in the Irish parliament; the winter quarter includes a short-term internship in Belfast.

Middle Eastern Studies. In a full-year or partial-year program (September through May), students spend the fall term at the American University in Cairo and the winter/spring term at Tel Aviv University in Israel. A wide variety of arts and sciences courses (taught in English) are available. Courses with a Middle Eastern focus are recommended. Students are encouraged to take an intensive "survival" Arabic and Hebrew language course while overseas.

North American Studies in Mexico. Conducted during the fall quarter at the University of the Americas in Puebla, this program addresses North American political and social issues from a Mexican perspective. The general focus is on social sciences; courses (taught in English) are available in economics, politics, and sociology. Spanish language classes (all levels) are available. Students may also enroll in other arts and sciences courses that are taught in Spanish.

Russian Studies. Recommended for the fall term, this program offers students an opportunity to focus on the cultures and languages of Russia. Students in this program choose the location of their study from a variety of host cities. Included are extracurricular field trips within Russia. Courses are taught in Russian with English textbooks. Basic knowledge of Russian language is required.

Sea Education Association. The Sea Semester offers a combination land-sea program in marine science, maritime navigation and history, and practical seamanship with deep-water oceanographic research. A six-week sea voyage, often to the Caribbean or the Canadian Maritimes, provides hands-on experience.

Simon Fraser University in Vancouver. This program, available during the fall or winter/spring term, offers students an opportunity to gain knowledge of the politics, governments, geographies, economies, and cultures of Canada and the Pacific Rim. Courses are available in all arts and sciences disciplines.

Spain: Language and Area Studies. This program is conducted at the Universities of Alicante and Seville and offers beginning and advanced Spanish language, along with courses taught in English from most arts and sciences disciplines. Included are several local excursions and accommodations with Spanish families. Students may go in the fall quarter, winter/spring quarters, or for a full year.

The Office of International Study Programs is involved in the process of developing further programs and welcomes inquiries and indications of students' needs and interests. Please contact the Office of International Study Programs in 400 Meserve Hall, 617-373-5162, for an updated list.

African-American Studies

Patrick Manning, PhD, *Professor and Acting Chair*

Associate Professors

Abdul Alkalimat, PhD

Sociology

Jordan Gebre-Medhin, PhD

Anthropology

Maryemma Graham, PhD

Literature

Robert L. Hall, PhD

History

William Lowe, MA

Music

Joseph D. Warren, PhD

Social Welfare

Assistant Professors

Leonard Brown, PhD

Music

Robin Chandler, PhD

Sociology and Art

Elizabeth H. Freyberg, PhD

Theatre

Kwamina Panford, PhD

Law, Policy, and Society

Associated Faculty

Oscar Brookins, PhD

Economics

Donald M. Jacobs, PhD

History

William F. Miles, PhD

Political Science

The diverse experiences of black people—in the United States, Africa, the Caribbean, South America, and other parts of the world—are the focus of the field of African-American studies. The curriculum is interdisciplinary in approach and includes historical, social and behavioral, and cultural studies. International studies and contemporary public policy issues are also integral parts of the program. In class, in co-op, and in internships, students apply theoretical knowledge to real-world problems and concerns. Plans for a study abroad program are under way.

Students with training in African-American studies have the knowledge to meet the challenges posed by the diverse racial, cultural, and ethnic groups in the United States and abroad. Many graduates attend professional schools or teach at the secondary or the college level. Others work in museums, libraries, or research centers; in business; or in public service, social service, or law-enforcement agencies.

Bachelor of Arts and Bachelor of Science Curriculum

AFR 1100, Introduction to African-American Studies; AFR 1131, African-American History 1; AFR 1155, Foundations of Black Culture; AFR 1249, Black Community and Social Change; one course on the Black experience outside the United States; and AFR 1355, Senior Seminar.

Five courses from one of three areas of concentration: historical, cultural, or social/behavioral studies. Courses offered in other departments may also satisfy this requirement with departmental approval.

Four courses which will allow students to explore additional topics and areas of interest.

In addition, complete the arts and sciences core curriculum (see page 31).

Minor Curriculum

AFR 1100, Introduction to African-American Studies; AFR 1131, African-American History 1; AFR 1155, Foundations of Black Culture; AFR 1249, Black Community and Social Change; and AFR 1355, Senior Seminar. One course on the Black experience outside the United States. One additional elective selected by the student in consultation with a departmental adviser.

American Sign Language–English Interpreting

Director to be announced

Teaching Staff

Alma L. Bournazian, MS
James Lipsky, BS

American Sign Language (ASL) is a language used by large numbers of people in the United States and Canada. By mastering ASL, students gain both access to the culture of Deaf America and insights into features of spoken language that are often taken for granted. Learning a modally different language gives students a new sense of the power of language and an appreciation of how it shapes their world. In this way, the mastery of ASL sharpens critical-thinking skills.

The program provides a firm foundation in language, linguistics, culture, and interpreting, plus a broad-based liberal arts education. American Sign Language courses are integral to degrees in human services with a specialization in deaf studies and in linguistics with a focus on ASL.

Opportunities for ASL–English interpreters are increasing, due to recent federal legislation. Graduates work as interpreters in such areas as higher education, advanced technology, and theatre.

The ASL Interpreter Education Project seeks to enhance the skills of interpreters currently working in the field and to increase the supply of competent interpreters in New England.

Bachelor of Science Curriculum

ASL 1101, ASL 1102, American Sign Language 1 and 2; ASL 1201, ASL 1202 Intermediate American Sign Language 1 and 2; ASL 1211, Deaf Culture; ASL 1250, Linguistics of ASL; ASL 1301, ASL 1302, Advanced American Sign Language Proficiency 1 and 2; ASL 1500, Introduction to Interpreting; ASL 1505, ASL 1506, ASL 1507, ASL–English Interpreting 1, 2, and 3; ASL 1520, Interpreter Role and Ethics; ASL 1521, Contrastive Analysis; ASL 1522, Discourse Analysis for Interpreters; ASL 1810, Special Topics in Interpreting; ASL 1820, Interpreting Practicum 1; ENG 1118, Introduction to Language and Linguistics; PSY 1110, Perspectives in Psychology 1; PSY 1112, Foundations of Psychology 2; SOA 1335, Language and Culture; SOC 1100, Introduction to Sociology; and CMN 1110, Voice and Articulation.

One course from the following: ENG 1402, Grammars of English; ENG 1407, Introduction to Semantics; ENG 1408, Topics in Linguistics; ENG 1690, Junior/Senior Seminar; LNL 1235, Applied Linguistics 1; LNL 1240, Bilingualism; PSY 1262, Psychology of Language.

One course from the following: PHL 1165, Moral Problems in Medicine; PSY 1271, Social Psychology; SOC 1102, Social Inequality and Communication; SOC 1135, Social Psychology; SOC 1140, Sociology of Prejudice; SOC 1310, Class, Power, and Social Change.

One course from the following: CRS 1200, Introduction to Special Education; ED 1302, The Human Services Professions; SOC 1240, Sociology of Human Service Organizations.

One course from the following: THE 1160, Movement 1; PSY 1263, Nonverbal Communication; CMN 1111, Oral Interpretation of Literature; CMN 1115, Foundations of Communication; CMN 1330, Interpersonal Communication 1.

In addition, complete the arts and sciences core curriculum (see page 31).

Art and Architecture

Peter Serenyi, PhD, *Professor and Chair*

Professor

Mardges Bacon, PhD

Associate Professors

Samuel S. Bishop, MFA

Mira Cantor, MFA

T. Neal Rantoul, MFA

Assistant Professors

Edwin C. Andrews, MFA

Julie M. Curtis, MFA

Mary Ann Frye, MFA

Monica Ponce de Leon, MAUD

George H. Thrush, MArch

Lecturers

Cynthia L. Baron, MBA

William K. Blake, MFA

Judith Brassard Brown, MFA

David A. Conant, MArch

E. Margaret Curley-Clay, MFA

Moulay A. Essakalli, MA

Joseph V. Ferrara, MArch

Christopher D. Ferrier, MFA

Katheryn M. Firth, MAUD

Elizabeth A. Gibb, MArch

Colleen M. Kiely, MFA

Douglas K. Kornfeld, MFA

William L. Loftis, MPhil

Michael McPherson, MFA

Scott C. Nash, MFA

Mark E. Pasnik, MAUD

Thomas J. Petit, MFA

Wendy J. Richmond, BA

Joel Sadagursky, BS

H. Mark Schatz, MArch

Ira L. Smith, MArch

Norma S. Steinberg, PhD

Nader Tehrani, MAUD

Alfred S. Venditto, BFA

Lawrence C. Volk, MFA

The visual arts are our oldest form of artistic expression. The ability to understand and use visual language is an increasingly important part of contemporary education.

The department aims to introduce art and architecture as both historical disciplines and creative activities; to offer a focused study of the visual arts, either through a critical examination of the language and the content of art and architecture within the context of a particular historical period, or through hands-on experience in a studio setting; and to offer a solid academic foundation for careers in architecture, graphic design, photography, and teaching the history and the practice of art.

Cooperative education placements for art majors include positions in architecture and design firms, museums, libraries, historical collections, and archives.

The city of Boston, with its superb architecture, museums, galleries, cinemas, and public library, is a primary resource for the department. Encouraging students to take advantage of these resources is a significant aim of the department. In addition, many of Boston's leading artists, architects, and designers teach our studio courses.

Bachelor of Arts and Bachelor of Science Curriculum

Major in art. ART 1100, History of Art to 1400, and ART 1101, History of Art since 1400; ART 1124, Basic Drawing; ART 1130, ART 1131, Visual Studies Foundation 1 and 2; and twelve art electives.

In addition, complete the arts and sciences core curriculum (see page 31).

Concentration in architecture. Leading to a BS degree that is not a professional degree in architecture. The twelve art electives are replaced by four architectural history courses (ART 111, Introduction to Architecture; ART 1203, Medieval Architecture or ART 1204, Renaissance Architecture; ART 1225, Modern Architecture 1 or ART 1223, American Architecture; and ART 1226, Modern Architecture 2).

Eight architectural studio courses: ART 1156, Architectural Drafting; ART 1150, 1151, 1252, 1253, 1341, 1342, Architectural Design 1 to 6; and ART 1352, Architectural Thesis.

Two computer courses: ART 1190, Introduction to Computer Graphics and ART 1295, Computer Aided Design.

Three building technology courses: ART 1256, ART 1257, Theory of Structures 1 and 2; and ART 1355, Environmental Systems.

Four math/science courses: MTH 1123, MTH 1124, Calculus 1 and 2; PHY 1221, PHY 1222, Physics for Engineering Students 1 and 2.

In addition, complete the arts and sciences core curriculum (see page 31).

Concentration in graphic design. Same requirements as for the art major, except that the twelve art electives are replaced by: ART 1132, Principles of Graphics; ART 1133, Graphic Design 1; ART 1134, Typography 1; ART 1144, Typography 2; ART 1160, Introduction to Photography; ART 1180, Video Basics; ART 1190, Introduction to Computer Graphics; ART 1213, Modern Art; ART 1230, History of Photography or ART 1237, Contemporary Directions in Cinema; ART 1240, History of Graphic Design; ART 1243, Graphic Design 2; ART 1244, Graphic Design 3; ART 1250, Color Theory and Practice; ART 1254, Intermediate Drawing; ART 1263, Introduction to Color Photography; ART 1280, Media Graphics; ART 1290, Electronic Publishing Design; ART 1291, Intermediate Computer Graphics Workshop; ART 1330, Advanced Visual Communication; and two Art/Design electives.

In addition, complete the arts and sciences core curriculum (see page 31).

Minor Curriculum

General minor. Select any six courses from the departmental curriculum.

Minor in history of architecture. ART 1203, Medieval Architecture; ART 1204, Renaissance Architecture; ART 1223, American Architecture; ART 1225, Modern Architecture: The Nineteenth Century; ART 1226, Modern Architecture: The Twentieth Century; and ART 1310, Seminar in Modern Architecture.

Minor in architecture. ART 1111, Introduction to Architecture; ART 1124, Basic Drawing or ART 1156, Architectural Drafting; or GE 1130, Engineering Design and Graphics; ART 1226, Modern Architecture 2; ART 1150, Architectural Design 1; ART 1151, Architectural Design 2; and ART 1252, Architectural Design 3; *one of the following:* ART 1253, Architectural Design 4; or ART 1295, Computer Aided Design; or ART 1355, Environmental Systems.

Minor in studio art. ART 1124, Basic Drawing; ART 1127, Basic Painting; ART 1130, Visual Studies Foundation 1; ART 1132, Principles of Graphics; ART 1133, Graphic Design 1; and ART 1254, Intermediate Drawing.

Minor in graphic design. ART 1130, ART 1131, Visual Studies Foundation 1 and 2; ART 1132, Principles of Graphics; ART 1134, Typography; ART 1133, Graphic Design 1; and ART 1250, Color Theory and Practice.

Minor in photography. ART 1160, Introduction to Photography; ART 1261, Intermediate Black and White Photography; ART 1230, History of Photography; ART 1233, Contemporary Directions in Photography; ART 1263, Introduction to Color Photography; and ART 1363, Advanced Photography Seminar.

Behavioral Neuroscience

The behavioral neuroscience major is a unit of academic coordination for undergraduates. It does not have faculty appointments or separate space, but does have a head advisor/director and an advisory board made up of the neuroscience faculty of the College of Arts and Sciences. The overall objective of the neuroscience major program is to draw together faculty and students who are interested in this interdisciplinary topic to provide undergraduates with an education in the field. Behavioral neuroscience focuses on brain mechanisms and how they give rise to behavioral functions in humans and animals. The field combines the disciplines of biology and psychology with a strong background in basic physical sciences and mathematics. The goal is to achieve an understanding of nerve cells, chemical neurotransmission, simple neural circuits and other physiological systems and then to see how they give rise to normal and pathological behavioral functioning. Studies range from the molecular to the molar as seen in the example of a drug which interacts with specific protein molecules or receptors in nerve cell membranes but also can be used to alter behavior. The curriculum prepares students to find employment in allied fields such as the bio-tech industry or to gain entrance to higher degree granting programs in graduate or medical school. For further information on the behavioral neuroscience major, contact Alexander A. Skavenski, director and professor of psychology, at 617-373-3043.

Bachelor of Science Curriculum

Psychology: PSY 1110, Perspectives in Psychology 1 or PSY 1111, Foundations of Psychology 1; PSY 1112, Foundations of Psychology 2 or PSY 1113, Perspectives in Psychology 2; PSY 1211, Behavioral Statistics 1; PSY 1212, Behavioral Statistics 2; PSY 1351, Psychobiology; PSY 1451, Psychopharmacology; PSY 1551, Psychobiology Laboratory.

One course from the following: PSY 1241, Developmental Psychology; PSY 1271, Social Psychology; PSY 1272, Personality 1; PSY 1373, Abnormal Psychology 1.

Two courses from the following: PSY 1231, Learning and Motivation 1; PSY 1262, Psychology of Language; PSY 1353, Animal Behavior; PSY 1364, Cognition; PSY 1365, Language and the Brain; PSY 1381, Sensation; PSY 1382, Perception.

Biology: BIO 1103, Principles of Biology 1; BIO 1104, Principles of Biology 2; BIO 1260, Genetics and Developmental Biology; BIO 1261, Introductory Biochemistry; BIO 1350, Regulatory Physiology.

Two Biology courses from the following: BIO 1311, Evolution; BIO 1341, Vertebrate Zoology; BIO 1347, Embryology; BIO 1348, Animal Histology; BIO 1351, Comparative Vertebrate Anatomy; BIO 1452, Comparative Neurobiology; BIO 1454, Comparative Vertebrate Physiology; BIO 1457, Neuroethology; BIO 1462, General Biochemistry Laboratory; BIO 1463, General Biochemistry 3; BIO 1467, Molecular Biology.

Mathematics and Chemistry: MTH 1106, Functions and Algebra and MTH 1107, Functions and Calculus and MTH 1108, Calculus; or MTH 1133, 1134, and 1135, Calculus for Biology Majors 1, 2, and 3; CHM 1111, General Chemistry for the Life Sciences 1; CHM 1112, General Chemistry for the Life Sciences 2A; CHM 1122, General Chemistry for the Life Sciences 2B; CHM 1264, Organic Chemistry for Biology Science Majors 1; CHM 1265, Organic Chemistry for Biology Science Majors 2.

Seminar: PSY 1651, Psychobiology *or* BIO 1490, Seminar in Biology.

BS Core Curriculum: For Natural Science majors, but excluding PSY 1110, PSY 1113, Perspectives in Psychology 1.

Note: if MTH 1107 is taken for Core Category 1, then take seven elective courses.

Electives: Select six courses. Recommended courses include: PHY 1201, PHY 1202, and PHY 1203, Physics for the Life Sciences 1, 2, and 3; and two Directed Study courses toward a Senior Honors Project or equivalent.

Biochemistry

Biochemistry includes nearly the entire spectrum of science—from physics and chemistry to biology and medicine. The biochemistry major, sponsored jointly by the departments of biology and chemistry, provides a strong foundation in mathematics and the physical sciences as well as thorough training in biochemistry, biology, and chemistry. In addition to formal classwork, opportunities are available for participation in faculty research programs on an individual basis or through the honors program. The large number of biotechnology companies and biomedical facilities in the Boston area provides a rich source of opportunities through Northeastern's program of cooperative education.

A Bachelor of Science degree in biochemistry allows students to enter the job market directly or go on to graduate, medical, veterinary, dental, law, or business school. Students may find positions in biotechnology companies, drug companies, or government agencies, working in laboratory or clinical research, quality control, production, information systems, marketing, or technical sales. Students may also pursue graduate study in biochemistry, molecular biology, cell biology, biophysics, genetics, toxicology, biotechnology, clinical chemistry, animal science, nutrition, plant science, or other biomedical sciences.

Students who are interested in attending medical, dental, or veterinary school following graduation are urged to consult with the preprofessional advisory committee early in their careers at Northeastern.

Bachelor of Science Curriculum

BIO 1103, BIO 1104, BIO 1105, Principles of Biology 1, 2, and 3; BIO 1280, Genetics; BIO 1461, General Biochemistry 1; BIO 1462, General Biochemistry Lab; BIO 1463, Cellular Biochemistry 3; BIO 1467, Molecular Biology; and BIO 1480, Senior Biochemistry Seminar.

CHM 1111, CHM 1122, General Chemistry for Life Sciences 1 and 2 *or* CHM 1151, CHM 1152, General Chemistry for Science Majors 1 and 2; CHM 1221, Analytical Chemistry; CHM 1271, CHM 1272, CHM 1273, Organic Chemistry for Chemistry Majors 1, 2, and 3; *or* CHM 1264, CHM 1265, Organic Chemistry for Biology Science Majors 1 and 2; CHM 1273, Organic Chemistry for Chemistry Majors 3; and CHM 1381, CHM 1382, Physical Chemistry 1 and 2.

MTH 1140, MTH 1141, MTH 1142, Calculus for Science Majors 1, 2, and 3 *or* MTH 1133, MTH 1134, MTH 1135, Calculus for Biology Majors 1, 2, and 3; PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Majors 1, 2, and 3; two quarters of corresponding physics lab courses; four advanced biology and chemistry electives (minimum of one from each discipline); and demonstrated computer literacy.

In addition, complete the arts and sciences core curriculum (see page 31).

Biology

David C. Wharton, PhD, *Professor and Chair*

Professors

Gwilym S. Jones, PhD
James M. Manning, PhD
Richard L. Marsh, PhD
Charles A. M. Meszoely, PhD
M. Patricia Morse, PhD
Fred A. Rosenberg, PhD
Ernest Ruber, PhD
Phyllis R. Strauss, PhD
Carol M. Warner, PhD

Associate Professors

Joseph L. Ayers, PhD
Kostia Bergman, PhD
Donald P. Cheney, PhD
Frederick C. Davis, PhD

H. William Detrich, PhD
Charles H. Ellis, Jr., PhD
Helen H. Lambert, PhD
Jacqueline M. Piret, PhD
Susan Powers-Lee, PhD
Daniel C. Scheirer, PhD
Wendy A. Smith, PhD

Assistant Professor

L. David Smith, PhD

Professors Emeriti

Francis D. Crisley, PhD
Charles Gainor, PhD
Nathan W. Riser, PhD

Adjunct Professors

Bruce B. Collette, PhD
Sergei Kashin, PhD

Adjunct Associate Professor

Stephen Brecher, PhD

Adjunct Assistant Professor

Slava S. Epstein, PhD

By majoring in biology, students develop a basic understanding of the organization and the processes of life, from molecules and cells through organs and organ systems to populations, species, ecosystems, and evolution. The major offers the mathematical, chemical, and physical background necessary for understanding biology and the practical scientific skills associated with each of these areas. It allows students to begin to specialize in a subdiscipline of biology such as animal physiology, cell biology, ecology, marine biology/microbiology, molecular biology, plant biology, zoology, etc. Numerous opportunities for relevant positions are available through Northeastern's program of cooperative education.

Students who decide to major in biology in the freshman or sophomore year may follow the prescribed academic sequence; students who enter the major in the middle year may complete the major in the normal time by taking some electives concurrently with the biology core, or Biocore, courses. After completing the Biocore, students interested in independent research may arrange to undertake a more extensive honors program involving up to four quarters of research.

To graduate with a major in biology, a student must have a cumulative quality-point average (QPA) of 2.0 for all science and mathematics courses required for the major. The Bachelor of Arts and Bachelor of Science degrees require a modern language. The Bachelor of Science program is more extensive in its mathematics and science requirements and may offer better preparation for some areas of postgraduate study. The department publishes *The Biology Undergraduate Advisory Book*, which explains the required and recommended courses and the QPA standards for biology majors. The advisory book is available in the Department of Biology, 414 Mugar Hall.

The undergraduate biology major prepares students for careers in the life sciences, including medical, dental, and other health-related fields. Students may find employment in federal, state, industrial, hospital, or university laboratories or in industries involved in the manufacture and distribution of pharmaceuticals, biological products, food, or scientific equipment. Biologists also work in fisheries, forestry services, county and state agencies, museums, aquariums, research vessels, and marine stations.

Graduate study culminating in a master's or doctoral degree can lead to careers in upper-level teaching or research in any of the life sciences.

Premedical or predental students are urged to consult with the preprofessional advisory committee early in their careers at Northeastern.

Bachelor of Arts Curriculum

BIO 1103, BIO 1104, BIO 1105, Principles of Biology 1, 2, and 3; BIO 1211, Environmental and Population Biology; BIO 1280, Genetics and Developmental Biology; BIO 1281, Introductory Biochemistry; and four advanced biology electives approved by department Advisory Committee.

MTH 1106, Fundamentals of Mathematics, MTH 1107, Functions and Basic Calculus, *or* Calculus (one year); PHY 1201 and PHY 1202, *or* PHY 1203, Physics for the Life Sciences 1 and 2, *or* 3, and PHY 1501, PHY 1502, Physics Lab for the Life Sciences 1 and 2, *or* PHY 1221 and PHY 1222, Physics for Science and Engineering Students 1 and 2, and PHY 1521 and PHY 1522, Physics Lab for Science and Engineering Students 1 and 2, *or* PHY 1223, Physics for Science and Engineering Students 3 and PHY 1523, Physics Lab for Science and Engineering Students 3; CHM 1111, General Chemistry I; CHM 1122, General Chemistry 2; CHM 1221, Analytical Chemistry; and CHM 1264, CHM 1265, Organic Chemistry I and 2.

In addition, complete the arts and sciences core curriculum (see page 31).

Bachelor of Science Curriculum

BIO 1103, BIO 1104, and BIO 1105, Principles of Biology 1, 2, and 3; BIO 1211, Environmental and Population Biology; BIO 1280, Genetics and Developmental Biology; BIO 1281, Introductory Biochemistry; BIO 1490, Senior Seminar; four advanced biology electives approved by department Advisory Committee.

Calculus (one year); PHY 1221, PHY 1222, and PHY 1223, Physics for Science and Engineering Students 1, 2, and 3; PHY 1531, PHY 1532, Physics Lab for Science Majors 1 and 2 *or* PHY 1523, Physics Lab for Science and Engineering Students 3; CHM 1111 and CHM 1122, General Chemistry I and 2; CHM 1221, Analytical Chemistry; CHM 1264 and CHM 1265, Organic Chemistry I and 2; and two additional advanced science electives approved by department Advisory Committee.

In addition, complete the arts and sciences core curriculum (see page 31).

Minor Curriculum

A minor in biology consists of any six biology courses for which the student has the prerequisites, plus two more courses in biology or other departments that serve as prerequisites for biology courses. At least five of the total eight courses must include laboratory, and a student may not count toward the biology minor more than one course, or course sequence, that covers substantially the same material.

To accommodate the needs of students majoring in different fields, the biology minor requirements have been phrased in a general and flexible way. To ensure that course selection is sound and appropriate to the student's background, each student's biology minor program must receive the signed approval of the biology minor advisor before the student has completed the first biology course.

Suggested course groupings for a biology minor have been developed for students with different backgrounds in college mathematics and science. The core minor for students with considerable work in mathematics, chemistry, or physics provides the foundation on which a biology major is built, without advanced specialization. For students with less college mathematics/science background, or none, three other minor options provide the opportunity for first-level exposure to the basic principles of biology. This option also gives students an opportunity to achieve some advanced specialization in plant and/or animal studies or to explore human biology, molecular biology, biochemistry, and the problems of the environment.

For further information, contact the biology minor adviser in 414 Mugar, 373-2260.

Chemistry

William M. Reiff, PhD, *Professor and Chair*

Professors

Terry K. Baker, PhD
Geoffrey Davies, PhD
David A. Forsyth, PhD
Bill C. Giessen, DrScNat
Barry L. Karger, PhD
Philip W. LeQuesne, PhD, DSci
Mary Jo Ondrechen, PhD
John L. Roebber, PhD
Alfred Viola, PhD
Paul Vouros, PhD
Philip M. Warner, PhD

Associate Professors

Thomas R. Gilbert, PhD
Rein U. Kirss, PhD
Ira S. Krull, PhD
Nelly M. Rodriguez, PhD

Laboratory Coordinator

Edward H. Witten, PhD

Assistant Professors

David E. Budil, PhD
David J. Jebaratnam, PhD
Lutfur R. Khundkar, PhD
Patricia A. Mabrouk, PhD

The study of chemistry focuses on the structure and properties of substances and the transformations they undergo. The department seeks to help students experience the intellectual stimulation of studying a physical science; grasp the basic principles and techniques of chemistry; and prepare for graduate study in chemistry, medicine, dentistry, or many other related fields.

Students in our Cooperative Education program can obtain invaluable practical professional experience to augment their classroom work. For many, these practical applications help to put their course work into a logical framework and help provide perspective. Electives, especially in the last two years, allow students to concentrate in those areas which have a special interest for them. The department encourages qualified students to undertake a research project under the supervision of a faculty member. An honors program is open to particularly able students.

The department publishes *Chemistry at Northeastern*, a pamphlet that details the chemistry major requirements. Copies may be obtained from 102 Hurtig Hall.

The Department of Chemistry offers two degree programs. The Bachelor of Science degree has more explicit scientific course requirements, while the Bachelor of Arts degree has more extensive requirements outside of the sciences. Both of the programs at Northeastern are approved by the American Chemical Society. The Bachelor of Science degree meets the society's requirements for certification; certified graduates are eligible for full membership in the society after two years of professional experience.

The Department of Chemistry also offers a Bachelor of Science with an Interdisciplinary Option. In this program some of the courses required for a traditional BS in chemistry have been replaced with required and elective courses focused on one of several disciplines, including business administration, education, environmental science, and law and public policy. The options are offered because chemists frequently take jobs that require knowledge and skills not provided by the traditional chemistry major program. The options programs add breadth to the curriculum for chemistry majors while still providing a technical core of math, physics, and chemistry courses. More information about these options are contained in the pamphlet *Options for Chemistry Majors* available from the Chemistry Department.

Bachelor of Arts Curriculum

CHM 1151, CHM 1152, General Chemistry for Science Majors 1 and 2; CHM 1231, Analytical Chemistry for Chemistry Majors; CHM 1271, CHM 1272, CHM 1273, Organic Chemistry for Chemistry Majors and Chemical Engineering Students 1, 2, and 3; CHM 1381, CHM 1382, CHM 1383, Physical Chemistry 1, 2, and 3; CHM 1394, CHM 1395, CHM 1396, Experimental Physical Chemistry 1, 2, and 3; CHM 1422, Instrumental Methods of Analysis; and CHM 1432, Instrumental Analysis Lab.

MTH 1140, MTH 1141, MTH 1142, Calculus 1, 2, and 3; MTH 1243, Calculus and Linear Methods 1 or MTH 1223, Calculus 4; PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3; and PHY 1522, PHY 1533, Physics Lab for Science Majors 2 and 3.

In addition, complete the arts and sciences core curriculum (see page 31).

Bachelor of Science Curriculum

CHM 1151, CHM 1152, General Chemistry for Science Majors 1 and 2; CHM 1231, Analytical Chemistry for Chemistry Majors; CHM 1271, CHM 1272, CHM 1273, Organic Chemistry for Chemistry Majors and Chemical Engineering Students 1, 2, and 3; CHM 1381, CHM 1382, CHM 1383, Physical Chemistry 1, 2, and 3; CHM 1394, CHM 1395, CHM 1396, Experimental Physical Chemistry 1, 2, and 3; CHM 1422, Instrumental Methods of Analysis; CHM 1432, Instrumental Analysis Lab; CHM 1441, Advanced Inorganic Chemistry; CHM 1451, Experimental Inorganic Chemistry; CHM 1461, Identification of Organic Compounds; CHM 1811, Advanced Chemical Lab Practice 1; and two advanced science or mathematics electives.

MTH 1140, MTH 1141, MTH 1142, Calculus 1, 2, and 3; MTH 1243, Calculus and Linear Methods 1 or MTH 1223, Calculus 4; MTH 1245, Differential Equations and Linear Methods 1 or MTH 1225, Mathematical Analysis; PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3; and PHY 1522, PHY 1533, Physics Lab for Science Majors 2 and 3.

Bachelor of Science with an Interdisciplinary Option

CHM 1151, CHM 1152, General Chemistry for Science Majors 1 and 2; CHM 1231, Analytical Chemistry for Chemistry Majors; CHM 1264, CHM 1265, Organic Chemistry 1 and 2; CHM 1381, CHM 1382, Physical Chemistry 1 and 2; CHM 1394, CHM 1395, Experimental Physical Chemistry 1 and 2; CHM 1422, Instrumental Methods of Analysis; CHM 1432, Instrumental Analysis Lab; MTH 1133, MTH 1134, MTH 1135, Calculus 1, 2, and 3; PHY 1201, PHY 1202, PHY 1203, Physics 1, 2, and 3; PHY 1501, PHY 1502, PHY 1503, Physics Lab 1, 2, and 3; and two math or science electives and the required and elective courses in the interdisciplinary area.

In addition, complete the arts and sciences core curriculum (see page 31).

Minor Curriculum

After a general chemistry sequence, CHM 1231, Analytical Chemistry for Chemistry Majors; CHM 1271, CHM 1272, CHM 1273, Organic Chemistry for Chemistry Majors and Chemical Engineering Students 1, 2, and 3; or CHM 1264, CHM 1265, Organic Chemistry 1 and 2; CHM 1381, CHM 1382, Physical Chemistry 1 and 2; and CHM 1394, CHM 1395, Experimental Physical Chemistry 1 and 2.

Communication Studies

Richard A. Katula, PhD, *Professor and Chair*

Associate Professors

Karen S. Buzzard, PhD
Carl W. Eastman, MA
Joanne Morreale, PhD
Michael L. Woodnick, MS
Alan J. Zaremba, PhD

Assistant Professors

Simon Jones, PhD
Anne Mattina, PhD

Instructors

Thomas Shaker, MA
Sherry Shepler, MA

Communication studies offers students a humanities-based, liberal arts education coupled with pre-professional training.

Students who major in communication studies learn to speak articulately and persuasively in a variety of situations, understand the history and traditions of the field of communication, and comprehend the business and technology of the communications industry. The program also helps students appreciate the aesthetics of human communication, communicate effectively in complex organizations such as businesses and government agencies, understand theories of human communication and research methods used to develop and support those theories, and effectively criticize and consume messages produced in public argument and mass communication media.

The department offers coursework in speech skill development, radio and television production and broadcasting, communication theories, and criticism.

Bachelor of Arts and Bachelor of Science Curriculum

CMN 1115, Foundations of Communication; CMN 1116, Public Speaking; CMN 1250, Introduction to Mass Communication; CMN 1300, Communication Theory; CMN 1330, Interpersonal Communication; CMN 1600, Introduction to Communication Research; and CMN 1610, Rhetorical Criticism.

In addition to the core courses, communication studies majors may choose from one of three concentrations: speech and rhetoric, organizational communication, and radio and television. Concentrations require five courses. In addition, three adviser-approved communication studies courses are required to complete the major.

Concentration in speech and rhetoric. CMN 1110, Voice and Articulation; CMN 1111, Oral Interpretation of Literature; CMN 1210, Advanced Voice and Articulation; CMN 1211, Advanced Oral Interpretation; CMN 1232, Communication and Gender; CMN 1239, Argumentation and Debate; CMN 1240, Advanced Studies in Speech Performance; CMN 1310, Classical Age in Speech and Rhetoric; CMN 1315, Theories of Persuasion; CMN 1410, Contemporary Public Address; CMN 1415, Persuasion in Contemporary Culture; CMN 1500, Special Topics in Communication Studies; and CMN 1554, Special Topics in Media.

Concentration in organizational communication. CMN 1232, Communication and Gender; CMN 1315, Theories of Persuasion; CMN 1318, Negotiation Skills; CMN 1331, Advanced Interpersonal Communication; CMN 1338, Group Discussion; CMN 1430, Organizational Communication; CMN 1431, Advanced Organizational Communication; CMN 1437, Consultation Skills; CMN 1453, Broadcast Management; CMN 1500, Special Topics in Communication Studies; CMN 1554, Special Topics in Media; and CMN 1555, Communication and the Quality of Life.

Concentration in radio and television. CMN 1232, Communication and Gender; CMN 1315 Theories of Persuasion; CMN 1317, The Audience in Mass Communication; CMN 1415, Persuasion in Contemporary Culture; CMN 1430, Organizational Communication; CMN 1450, Television Studio Production; CMN 1451, Foundation of Broadcast Technology; CMN 1452, Radio Production; CMN 1453, Broadcast Management; CMN 1454, Programming for Radio and Television; CMN 1455, Television Field Production; CMN 1500, Special Topics in Communication Studies; and CMN 1554, Special Topics in Media.

CMN 1895, CMN 1896, Internship in Communication Studies, and CMN 1890, CMN 1891, CMN 1892, Directed Study, may be taken for credit in any of the three concentration areas.

Minor Curriculum

CMN 1116, Public Speaking; CMN 1300, Introduction to Communication Theory; CMN 1330, Interpersonal Communication; and CMN 1338, Group Discussion.

Four courses from the following: CMN 1110, Voice and Articulation; CMN 1111, Oral Interpretation of Literature; CMN 1232, Communication and Gender; CMN 1239, Argumentation and Debate; CMN 1250, Introduction to Mass Communication; CMN 1318, Negotiation Skills; CMN 1331, Advanced Interpersonal Communication; CMN 1410, Contemporary Public Address; CMN 1415, Techniques of Persuasion; CMN 1437, Consultation Skills; CMN 1430, Organizational Communication; CMN 1600, Introduction to Communication Research; and CMN 1610, Rhetorical Criticism. Individual programs may be approved through the Communication Studies Department.

Economics

John Adams, PhD, *Professor and Chair*

Professors

M. Shahid Alam, PhD
Barbara M. Fraumeni, PhD
Harold M. Goldstein, PhD
Irwin L. Herrnstadt, PhD
Sungwoo Kim, PhD
Steven A. Morrison, PhD
Gustav Schachter, PhD
Andrew M. Sum, MA

Associate Professors

Neil O. Alper, PhD
Bruce R. Bolnick, PhD
Oscar T. Brookins, PhD
Kamran N. Dadkhah, PhD
Alan W. Dyer, PhD
Gregory Wassall, PhD

Assistant Professors

Jonathan H. Haughton, PhD
Katherine A. Kiel, PhD
Stephen L. Parente, PhD

Professor Emeritus

Morris A. Horowitz, PhD

Economics is the study of how societies produce and exchange goods and services to satisfy material needs. Economists analyze the process of economic growth and identify policies that contribute to economic stability and progress.

In the economics program students examine the sources of economic growth—how societies produce more of what they need. Undergraduates study economics as part of a broad interest in the social sciences to develop specialized skills useful in today's complex labor market. The major in economics is a good foundation for graduate studies in advanced economics, public policy, law, or business.

Macroeconomics, which focuses on the overall economy, deals with such problems as inflation, unemployment, growth and instability, economic development, and governmental monetary and fiscal policies.

Microeconomics examines the economic behavior of individuals, households, firms, industries, and trade among countries. It seeks to assess the economic effects of market power and environmental damage and analyzes the economic aspects of natural resources, poverty, health, income distribution, trade unions, and government regulation.

Courses in economics cover international trade; the behavior of families, firms, and industries in the market economy; the environmental costs of growth; and the economic aspects of natural resources, poverty, health, labor market discrimination affecting women and minorities, trade unions, and governmental oversight. International and comparative perspectives are emphasized, most directly in courses in economic development of the Third World and economic history.

Graduates may find jobs in federal, state, and local governments, major corporations, or financial institutions. Their work may involve planning and forecasting, assessing labor needs, and making financial studies. They may estimate consumer demand for new products, conduct research, teach, or provide specialized consulting services.

**Bachelor of Arts
Curriculum**

ECN 1215, Macroeconomic Theory; ECN 1216, Microeconomic Theory; ECN 1250, Statistics 1; ECN 1337, History of Economic Thought; and eight other economics courses, of which at least six must be upper-level (non-Pathway) electives. MTH 1113, College Mathematics for Business and Economics; MTH 1114, Calculus for Business and Economics; and four social science electives other than economics.

In order to graduate with a BA in economics, a student must earn an average grade of C (QPA=2.00) or better in the four core courses, ECN 1215, ECN 1216, ECN 1250, and ECN 1337.

In addition, complete the arts and sciences core curriculum (see page 31).

**Bachelor of Science
Curriculum**

ECN 1215, Macroeconomic Theory; ECN 1216, Microeconomic Theory; ECN 1250, Statistics 1; ECN 1351, Problems in Economic Research; and thirteen other economics courses, of which at least nine must be upper-level (non-Pathway) electives. MTH 1113, College Mathematics for Business and Economics; MTH 1114, Calculus for Business and Economics; and four social science electives other than economics.

In order to graduate with a BS in economics, a student must earn an average grade of C (QPA=2.00) or better in the four core courses, ECN 1215, ECN 1216, ECN 1250, and ECN 1351.

In addition, complete the arts and sciences core curriculum (see page 31).

Minor Curriculum

ECN 1215, Macroeconomic Theory; ECN 1216, Microeconomic Theory; and six other courses in economics, of which at least two must be upper-level (non-Pathway) electives and one must be ECN 1250, Statistics, or equivalent (unless a comparable course is required by the major department). Any course taken outside the Department of Economics to satisfy these economics elective requirements must be approved by a faculty adviser in the department.

Education

Holbrook C. Robinson, PhD, *Associate Professor and Acting Chair*

Professors

Maurice Kaufman, PhD
Mervin D. Lynch, PhD
Sandra M. Parker, EdD

Associate Professors

Nicholas J. Buffone, PhD
Leslie A. Burg, EdD
Joseph Meier, EdD
Irene A. Nichols, EdD
Barbara A. Schram, EdD

Assistant Professor

Thomas H. Clark, MA
Terry L. Haywoode, PhD

Professor Emeritus

John D. Herzog, PhD

The Department of Education helps students to understand principles of curriculum, instruction, and evaluation; to analyze and think critically about teaching and learning; to communicate effectively; and to understand the legal and moral responsibilities of the teaching profession. The department offers undergraduate programs that enable students to obtain provisional Massachusetts teacher certification, which is recognized in other states. (Full certification requires a master's degree.) All students who seek teaching certificates in Massachusetts need degrees that consist of a major in the arts and sciences and a program of study in education. Students acquire specified competencies established for certification in Massachusetts through designated courses, related fieldwork, cooperative education experiences, and full-time student teaching arranged by the education department.

**Early Childhood
Education and Elementary
Education**

Students who wish to obtain certification as early childhood or elementary education teachers complete a major in the arts and sciences and enroll in a program of education courses. For specific education program course requirements, students should consult the *1996-1997 College of Arts and Sciences Guidebook*.

Secondary Education

Students seeking high-school teacher certification should enroll in an arts and sciences major and a minor in secondary education.

Students preparing to teach biology, chemistry, earth science (geology), English, history, mathematics, physics, or foreign languages in Massachusetts schools should major in the pertinent field. Students majoring in economics, history, political science, or sociology may pursue certification in the teaching of social studies.

Secondary education minor. CRS 1200, Introduction to Special Education; ED 1103, Human Development and Learning 2; ED 1104, Analysis of the Instructional Process; ED 1306, Measurement and Evaluation; ED 1410, ED 1411, Methods and Materials for Teaching Adolescents 1 and 2; ED 1412, Fundamentals of Curriculum Development; and ED 1417, Student Teaching and Seminar.

Student Teaching

Student teaching is a full-time experience for one quarter of the senior year. A professor and a cooperating classroom teacher share supervisory responsibility.

English

Stuart S. Peterfreund, PhD, *Professor and Chair*

Professors

Samuel J. Bernstein, PhD
Robert J. Blanch, PhD
Francis C. Blessington, PhD
Irene Fairley, PhD
Wayne Franklin, PhD
Gary Goshgarian, PhD
Earl N. Harbert, PhD
Guy Rotella, PhD
Michael Ryan, PhD
Herbert L. Sussman, PhD

Arthur J. Weitzman, PhD
Joseph E. Westlund, PhD
Kristin Woolever, PhD

Associate Professors

Maryemma Graham, PhD
Kathleen Kelly, PhD
Mary K. Loeffelholz, PhD
Janet Randall, PhD
Bonnie TuSmith, PhD
Susan Wall, PhD

Assistant Professors

Kathy Howlett, PhD
Marina Leslie, PhD
Linda Loehr, PhD
Barbara Rodriguez, PhD

Lecturers

Joseph B. deRoche, MFA
David W. Tutein, MA

The department offers courses in creative, expository, and technical writing; linguistics; literary studies; and American and British literature.

Students who have completed the freshman English requirement and are in good academic standing may major or minor in English. The broad-based major requires proficiency in a number of approaches—including historical, generic, and theoretical—to the study of language and literature. The more narrowly focused minor gives students intensive exposure to literature, writing, linguistics, or technical communication.

English majors prepare for careers in teaching and research, advertising and publishing, radio and television—any field in which communication and critical judgment go hand in hand. The department also offers an intellectual and cultural framework for preprofessional students in law, medicine, business, engineering, or computer science.

Bachelor of Arts and Bachelor of Science Curriculum

ENG 1126, Backgrounds in English and American Literature; ENG 1120, ENG 1121, Survey of English Literature 1 and 2; ENG 1123, ENG 1124, Survey of American Literature 1 and 2; ENG 1307, Approaches to Literature; two period courses; three major figure courses (one must be Shakespeare); one language or writing course; one genre course; one alternative literature course; one junior/senior seminar; and three electives in English.

In addition, complete the arts and sciences core curriculum (see page 31).

Concentration in creative writing. ENG 1109, Introduction to Creative Writing; ENG 1351, Creative Writing; one course from the following: ENG 1356, Drama Workshop; ENG 1357, Poetry Workshop; ENG 1358, Fiction Workshop; ENG 1359, Nonfiction Workshop; ENG 1360, Topics in Writing; and must complete ENG 1362, Publication Arts.

Concentration in literature. One language or writing course from the following: ENG 1118, Introduction to Language and Linguistics; ENG 1119, History of the English Language; ENG 1351, Creative Writing; ENG 1352, Advanced Writing; ENG 1357, Poetry Workshop; ENG 1358, Fiction Workshop; ENG 1359, Nonfiction Workshop; and three English electives.

Minor in Literature Curriculum

Six courses required, two from the following: ENG 1120, Survey of English Literature 1; ENG 1121, Survey of English Literature 2; ENG 1123, Survey of American Literature 1; ENG 1124, Survey of American Literature 2; one course from two of the following categories: (a) literary periods, (b) major figures, and (c) language and writing; one elective from (a), (b) or (c); a junior/senior seminar.

Minor in Writing Curriculum

Six courses required, four from the following: ENG 1350, Intermediate Writing; ENG 1351, Creative Writing; ENG 1125, Technical Writing 1; ENG 1370, Technical Writing 2; ENG 1352, Advanced Writing; ENG 1381, Writing for the Professions: Business Administration; ENG 1382, Writing for the Professions: Criminal Justice; ENG 1357, Poetry Workshop; ENG 1358, Fiction Workshop; ENG 1362, Publication Arts; ENG 1359, Nonfiction Workshop; and two writing or literature electives.

Minor in Linguistics Curriculum

See page 35.

Minor in Technical Communication Curriculum

See page 35.

Geology

Richard H. Bailey, PhD, *Professor and Chair*

Professors

Richard S. Naylor, PhD
William A. Newman, PhD

Associate Professors

Bernard L. Gordon, MS
Peter S. Rosen, PhD
Martin E. Ross, PhD

Geology is a broad-based science that deals with the study of the physical features, composition, history, and processes of the earth. Many geologists today are working to solve environmental problems, to develop and protect water resources, and to discover new deposits of minerals and fossil fuels.

Bachelor of Science and Bachelor of Arts programs are offered in geology and in environmental geology. These programs require coursework in mathematics (through calculus), physics, and chemistry, and a set of required and elective geology courses. All students complete the College of Arts and Sciences core. Students in the Bachelor of Arts programs take a broader array of non-science courses and must demonstrate proficiency in a foreign language (through intermediate II level). Courses in the geology major focus on the basic composition (mineralogy and petrology), structure (structural geology and stratigraphy), and surface of the earth (geomorphology and geochemistry). The environmental geology major has a greater emphasis on earth surface processes, human interactions, and land-use planning. Typical environmental geology courses include hydrogeology, land-use planning, water in environmental planning, groundwater geochemistry, and coastal processes.

Fieldwork is an essential component of training in geology, and many of our courses utilize field sites throughout New England to demonstrate geological processes. In addition to these local trips, the department has taken students on longer field excursions to the Cascade Mountains of Washington, to the island of San Salvador in the Bahamas, to the Grand Canyon, and to the Black Hills of South Dakota. Students also have the option to complete undergraduate research courses with a faculty member. Undergraduate research projects usually involve substantial field and lab work completed under the guidance of the geology faculty. Honors students in geology have the opportunity to participate in special sections of geology courses and in special honors activities.

The geology program offers basic knowledge needed to work in almost any of the geologic professions in both industry and government, or to continue studies in graduate school. The major in environmental geology is particularly popular, and many of our recent graduates work for environmental or geotechnical firms. Students involved in the optional co-op plan typically work with local engineering, environmental consulting companies, or with government agencies. These jobs often involve assessing building sites, evaluating land use, and studying many problems concerned with groundwater contamination and remediation.

Bachelor of Arts in Geology Curriculum

GEO 1212, Physical Geology; GEO 1213, Physical Geology Lab; GEO 1222, Historical Geology; GEO 1223, Historical Geology Lab; GEO 1310, Descriptive Mineralogy; GEO 1308, Petrology; GEO 1440, Geomorphology; GEO 1418, Structural Geology; and five geology electives.

MTH 1106, Fundamentals of Mathematics and MTH 1107, Functions and Basic Calculus *or* MTH 1107, Functions and Basic Calculus and MTH 1108, Calculus; PHY 1221, Physics for Science and Engineering Students *or* PHY 1201, Physics for the Life Sciences 1; CHM 1111, CHM 1122, General Chemistry 1 and 2.

In addition, complete the arts and sciences core curriculum (see page 31).

Bachelor of Science in Geology Curriculum

GEO 1212, Physical Geology; GEO 1213, Physical Geology Lab; GEO 1222, Historical Geology; GEO 1223, Historical Geology Lab; GEO 1310, Descriptive Mineralogy; GEO 1311, Optical Crystallography; GEO 1308, Petrology; GEO 1418, Structural Geology; GEO 1440, Geomorphology; and eight geology electives.

MTH 1107, Functions and Basic Calculus and MTH 1108, Calculus *or* MTH 1123, MTH 1124, and MTH 1125, Calculus 1, 2, and 3; PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3; CHM 1111, CHM 1122, General Chemistry 1 and 2; CHM 1221, Analytical Chemistry *or* GEO 1412, Geochemistry; and two approved additional science electives.

In addition, complete the arts and sciences core curriculum (see page 31).

Minor in Geology Curriculum

GEO 1212, Physical Geology; GEO 1222, Historical Geology; GEO 1308, Petrology; GEO 1213, Physical Geology Lab; GEO 1223, Historical Geology Lab; plus four geology electives (GEO 1250 or higher number) chosen with the approval of the geology department.

Bachelor of Arts in Environmental Geology Curriculum

GEO 1212, Physical Geology; GEO 1213, Physical Geology Lab; GEO 1222, Historical Geology; GEO 1223, Historical Geology Lab; GEO 1308, Petrology; GEO 1440, Geomorphology; GEO 1438, Geology and Land-use Planning; and five geology electives.

	<p>MTH 1107, Functions and Basic Calculus and MTH 1108, Calculus <i>or</i> MTH 1106, Fundamentals of Mathematics and MTH 1107, Functions and Basic Calculus; BIO 1103, BIO 1104, Principles of Biology 1 and 2; CHM 1111, CHM 1122, General Chemistry 1 and 2.</p> <p>In addition, complete the arts and sciences core curriculum (see page 31).</p>
Bachelor of Science in Environmental Geology Curriculum	<p>GEO 1212, Physical Geology; GEO 1213, Physical Geology Lab; GEO 1222, Historical Geology; GEO 1223, Historical Geology Lab; GEO 1308, Petrology; GEO 1310, Descriptive Mineralogy; GEO 1440, Geomorphology; GEO 1438, Geology and Land-Use Planning; GEO 1442, Water in Environmental Planning; and eight geology electives.</p> <p>MTH 1107, Functions and Basic Calculus; MTH 1108, Calculus; PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3 <i>or</i> BIO 1103, BIO 1104, BIO 1105, Principles of Biology 1, 2, and 3; CHM 1111, CHM 1122, General Chemistry 1 and 2; and CHM 1221, Analytical Chemistry <i>or</i> GEO 1412, Geochemistry; and two approved additional science electives.</p> <p>In addition, complete the arts and sciences core curriculum (see page 31).</p>
Minor in Environmental Geology Curriculum	<p>GEO 1212, Physical Geology <i>or</i> GEO 1140, Environmental Geology; GEO 1213, Physical Geology Lab; GEO 1222, Historical Geology; GEO 1223, Historical Geology Lab; GEO 1438, Geology and Land-Use Planning; plus four geology electives (GEO 1250 or higher number) chosen with the approval of the geology department.</p>

History

William M. Fowler, Jr., PhD, *Professor and Chair*

Professors

Ballard C. Campbell, PhD
Harvey Green, PhD
Donald M. Jacobs, PhD
Patrick Manning, PhD
Clay McShane, PhD
Anthony N. Penna, DA
Raymond H. Robinson, PhD

Associate Professors

Charmarie J. Blaisdell, PhD
Laura L. Frader, PhD

Assistant Professors

Christina Gilmartin, PhD
Gerald H. Herman, MA
Felix V. Matos Rodriguez, PhD

A major in history, which examines humanity's diverse and complex past, provides students with an excellent opportunity to develop a greater understanding and appreciation of today's cultures and civilizations.

The department offers two degree programs: a Bachelor of Arts, for students preparing for graduate work in history or for teaching careers; and the Bachelor of Science, designed for students planning careers in public history fields or in the "new history" areas that require technical understanding of the social sciences.

All history majors are required to take courses in Western or world civilization, American history, and historical methodology, as well as a range of history electives that explore diverse periods and locales. Students finish the major with a seminar in Approaches to History, in which they complete a substantial research project that demonstrates both substantive and methodological expertise. Eligible students are encouraged to test themselves by doing an honors thesis. Students also have the opportunity, through directed study, to work on an individual basis with senior faculty on topics of mutual interest.

The major also provides students with opportunities to work as historians-in-training in diverse settings through cooperative education placements, fieldwork, internships, and other experiential learning activities. Students who use the major as a broad-based preparation for careers in business, law, journalism, or government have opportunities for relevant cooperative education experiences in the business and professional worlds.

Many history majors want to work directly in their field of study. Those who plan to teach in public school may combine history with education courses that can lead to state certification; those who plan to teach in private secondary schools need not be certified by state authorities. Teaching positions in colleges and universities require master's and doctoral degrees.

Many professional historians teach and write; others work in public archives, private historical societies, museums, government agencies, media, and restoration projects.

Bachelor of Arts Curriculum

HST 1101, Western Civilization to 1648 *or* HST 1121, World Civilization to 1648; *or* HST 1701, Western Civilization 1 (Honors); HST 1122, World Civilization since 1648 *or* HST 1102, Western Civilization since 1648 *or* HST 1702, Western Civilization 2 (Honors); HST 1201, The United States to 1877 *or* HST 1711, The United States to 1877 (Honors), and HST 1202, The United States since 1877 *or* HST 1712, The United States since 1877 (Honors); HST 1241, The Historian's Craft; HST 1805, Approaches to History; nine history electives distributed as follows: two courses in Group A (ancient, medieval, and

early modern Europe); two courses in Group B (modern Europe); two courses in Group C (America); two courses in Group D (other regions); and one course in any of the above groups.

In addition, complete the arts and sciences core curriculum (see page 31).

Bachelor of Science Curriculum

HST 1101, Western Civilization to 1648 *or* HST 1121, World Civilization to 1648 *or* HST 1701, Western Civilization 1 (Honors); HST 1122, World Civilization since 1648 *or* HST 1702, Western Civilization 2 (Honors); HST 1102, Western Civilization since 1648; HST 1201 *or* HST 1711, The United States to 1877 (Honors); and HST 1202, The United States since 1877 *or* HST 1712, The United States since 1877 (Honors); HST 1241, The Historian's Craft; HST 1805, Approaches to History; eleven history electives distributed as follows: two courses in Group A (ancient, medieval, and early modern Europe); two courses in Group B (modern Europe); two courses in Group C (America); two courses in Group D (other regions); and three courses in any of the above groups.

A minor approved by the student's adviser; a statistics course (for example, PSY 1211, SOC 1320, or ECN 1250); and a computer course, preferably COM 1105.

In addition, complete the arts and sciences core curriculum (see page 31).

Minor Curriculum

Eight courses in history, two of which must be selected from the following: HST 1101, Western Civilization to 1648 *or* HST 1121, World Civilization to 1648 *or* HST 1701, Western Civilization 1 (Honors); HST 1102, Western Civilization since 1648 *or* HST 1122, World Civilization since 1648 *or* HST 1702, Western Civilization 2 (Honors); HST 1201, The United States to 1877 *or* HST 1711, The United States to 1877 (Honors); and HST 1202, The United States since 1877 *or* HST 1712, The United States since 1877 (Honors).

Human Services

Barbara A. Schram, EdD, *Director and Associate Professor, Education*

Advisory Committee

Susan Beaton, MA

*Human Service Internship
Supervisor*

Margie Crooks, MA

Counseling Center

Patricia Fetter, PhD

*Counseling Psychology,
Rehabilitation, and Special
Education*

Terry Haywoode, PhD

Education/Human Services

Wilfred E. Holton, PhD

Sociology/Anthropology

Louise LaFontaine, EdD

*Counseling Psychology,
Rehabilitation, and Special
Education*

Gordana Rabrenovic, PhD

Sociology/Anthropology

David A. Rochefort, PhD

Political Science

Martha Wengert, MEd

Cooperative Education

Harold S. Zamansky, PhD

Psychology

Professor Emeritus

John D. Herzog, PhD

Human Services is a behavioral sciences major that includes courses in psychology, sociology, education, political science, economics, counseling, and social sciences. Students take basic foundation courses, skills courses, and complete two intensive fieldwork internships in Boston agencies. The major may lead to careers in many diverse areas of the helping professions or to graduate programs in social work, counseling, rehabilitation, education, and law. Students who major in human services select specialization areas such as deaf studies, counseling, gerontology, adolescent issues, human services administration, drug and alcohol services, early childhood issues, special needs, education, and more. Students prepare for positions in both public and private agencies including: casework in social service and welfare agencies; therapeutic treatment in mental health settings; rehabilitation counseling; parole and court outreach work in programs for delinquent youth; staff work in halfway houses, drug treatment institutions, and penal institutions; community organizing; services for the aging at home and in institutions; administration in human services agencies; evaluation and grant writing for social programs; and counseling and support for deaf clients through fluency in American Sign Language. Students in the major have special opportunities to participate in the Human Services Student Organization, in the Fenway Project, which provides student volunteers to community agencies, and Alpha Delta Omega, the national honor society in Human Services. The major has an extensive academic counseling capacity and encourages students to undertake independent studies, work on grants, and pursue other special projects.

Bachelor of Arts Curriculum

Prerequisite courses. SOC 1100, Introduction to Sociology *or* ED 1100, Education and Social Science; ED 1302, Human Services Professions; PSY 1111, PSY 1112, Foundations of Psychology 1 and 2 *or* ED 1102, ED 1103, Human Development and Learning 1 and 2; POL 1111, Introduction to American Government *or* other basic political science course; ECN 1115, Principles of Macroeconomics *or* ECN 1116, Principles of Microeconomics *or* other basic economics course.

Core courses. PSY 1211, Statistics in Behavioral Science 1 *or* SOC 1320, Introduction to Statistical Analysis *or* ED 1307, Introduction to Educational Statistics; PSY 1511, Experimental Design in Psychology *or* SOC 1321, Research Methods 1 *or* SOC 1324, Human Services Research and Evaluation; SOC 1240, Sociology of Human Services Organizations; PSY 1272, Personality 1; PSY 1373, Abnormal

Psychology 1; CRS 1314, Introduction to Counseling; SPC 1338, Group Discussion *or* SPC 1330, Interpersonal Communication 1; ED 1309, Intervention Strategies; INT 1333, Senior Seminar.

Fieldwork. HS 1336 and HS 1337, Field Internship in Human Services 1 and 2.

Additional courses. Three courses focused on social and community issues such as poverty and welfare, minority affairs, or special needs populations, chosen with the student's academic adviser; and five courses in a particular specialization within human services, chosen with the student's academic adviser.

In addition, complete the arts and sciences bachelor of arts core curriculum (see page 31).

Bachelor of Science Curriculum

Prerequisite courses. Same as for the Bachelor of Arts curriculum.

Core courses. Same as for the Bachelor of Arts curriculum plus POL 1329, American Social Welfare Policy *or* SOC 1501, Social Policy and Social Intervention.

Additional courses. Three courses focused on social and community issues such as poverty and welfare, minority affairs, or special needs populations, chosen with the student's academic adviser; a six-course specialization with human services, chosen with the student's academic adviser; ED 1107, Beginning Computer Use *or* COM 1105, Computer Science and Its Applications.

In addition, complete the arts and sciences bachelor of science core curriculum (see page 31), plus another mathematics or science course.

Specialization in Deaf Studies

Prerequisite, core and fieldwork courses as listed above. ASL 1101, ASL 1102, American Sign Language 1 and 2; ASL 1201, ASL 1202, Intermediate Sign Language 1 and 2; and one of the following: ASL 1211, Deaf Culture; ASL 1212, Deaf History; PSY 1363, American Sign Language Linguistics; *or* ASL 1401, American Sign Language Literature.

Major in Human Services Combined with Elementary Education Program

Students can now major in Human Services and prepare themselves as beginning teachers at the elementary level, meeting the new requirements in Massachusetts. This program gives students a strong background in psychology, sociology, human services, and other fields of study along with skills in teaching. See a Human Services adviser or the chair of the Department of Education for the requirements of the double major.

Minor in Human Services Curriculum

ED 1302, Human Services Professions; ED 1309, Intervention Strategies; INT 1336, Field Experience in Human Services 1; SOC 1240, Sociology of Human Services Organizations; and two human services specialization courses approved by a human services adviser.

International Affairs

Advisory Committee

John Adams, PhD

Economics

Timothy Donovan, PhD

Associate Dean,

Arts & Sciences

Inez Hedges, PhD

Modern Languages

T. Anthony Jones, PhD

Sociology and Anthropology

Patrick Manning, PhD

History/African-

American Studies

Denis J. Sullivan, PhD

Political Science

The major in international affairs (BA) provides students with the opportunity to develop a deep understanding of both regional and global issues. It is intended to prepare students for the interdependent world in which they will live, work, compete, and cooperate upon graduation.

Students wishing to complete the major in international affairs will take seventeen courses; in addition, students must fulfill a Foreign Language Proficiency requirement, an International Experience requirement, and the BA Core Curriculum.

Bachelor of Arts Curriculum

Required courses. IAF 1100, Introduction to International Affairs; IAF 1104/SOA 1104, Cultures of the World; IAF 1112/POL 1112, Introduction to International Relations; IAF 1113/POL 1113, Introduction to Foreign Governments; IAF 1122/HST 1122, World Civilization since 1648; IAF 1300, International Conflict and Negotiation; IAF 1330/ECN 1330, Development Economics; IAF 1400, International Experience Workshop; and IAF 1500, Senior Seminar in International Affairs. Eight *elective courses* must be selected from those listed under the program's dual categories of *Regional Analysis* and *Global Dynamics and Development*. Students will take four courses from *Regional Analysis*, with at least three of these electives from within the same regional subcategory. Students will also take any four electives from *Global Dynamics and Development*.

Foreign Language Proficiency is defined as passing the Intermediate 2 level of a foreign language or meeting a comparable criterion approved by the Department of Modern Languages. (This requirement in the major also parallels the language requirement for the Bachelor of Arts degree in the College of Arts and Sciences.)

International Experience requires that students spend at least one term abroad. Students may fulfill this requirement by choosing at least one of three options: (a) study abroad, through enrollment in a Northeastern University study abroad program or (with prior approval) through another university; a maximum of two courses taken as part of study abroad may be counted in fulfilling the number of electives, and these courses must fall within the proper elective categories; (b) internship abroad, which the student may develop individually or which may be sponsored by a major department and/or a Northeastern University study abroad program; the internship may carry academic credit, with proper approval; (c) international co-op, which would be arranged through the Division of Cooperative Education.

Students must also satisfy requirements for the BA Core Curriculum. (The international affairs major is considered part of the social sciences.)

Elective categories. Students must select a total of eight courses from the dual elective categories of *Regional Analysis* and *Global Dynamics and Development*. Four courses must be chosen from each category. Students may choose any four courses from *Global Dynamics and Development*. Students must choose four courses from *Regional Analysis*, with at least three from the same subcategory.

Minor Curriculum

Students take seven courses, plus fulfill an International Experience. Foreign language proficiency is not required but strongly recommended, and students are also advised to undertake foreign language study while abroad during fulfillment of their International Experience as appropriate.

IAF 1100, Introduction to International Affairs; IAF 1500, Senior Seminar in International Affairs; five electives chosen from categories of *Regional Analysis* and *Global Dynamic and Development* and to be distributed as described (see below). International Experience, fulfilled by choosing one from among four options: (a) study abroad, through enrollment in one of the Northeastern University study abroad programs, or, with prior approval, through another university; a minimum of one term is required, with two terms encouraged; a maximum of two courses taken as part of study abroad may be counted in fulfilling the number of electives, and these courses must fall within the proper elective categories; (b) internship abroad, which the student may develop or which may be sponsored by a major department or CAS International Study Programs Office; the internship may carry academic credit (with departmental approval); (c) international coop, arranged through the Division of Cooperative Education; or (d) directed study on campus (when the foregoing are not feasible), to be supervised by faculty specialized in a specific country or region of the student's interest; a minimum of 8 credits is required.

A total of five elective courses is required from the dual categories of *Regional Analysis* and *Global Dynamics and Development*, as listed below. Students must take at least two courses from each category. Students must select two or three courses from *Regional Analysis* and these courses must be chosen from at least two different regional subcategories.

I Regional Analysis. Africa: AFR 1156/MUS 1181, Music of Africa; AFR 1191/HST 1620, Early African Civilization; AFR 1193, Africa Today; AFR 1195, Identity and Nationalism in Africa; AFR 1197/HST 1621, Modern African Civilization; AFR 1342/POL 1342, Crisis and Conflict in Black Africa; AFR 1402/HST 1623, History of West Africa; AFR 1405/HST 1625, South African History.

Asia: HST 1581, American Images of China; HST 1610, Topics in Asian History; HST 1633, Modern China; HST 1634, Contemporary China; HST 1637, Modern Japan; MUS 1183, Music of East Asia; PHL 1250, Chinese Philosophy; PHL 1255, Indian Philosophy; PHL 1275, Eastern Religions; PHL 1293, Eastern Philosophy; POL 1332, Government and Politics of Japan; POL 1371, Government and Politics of China; SOC 1104, Sociology of Japan.

Europe: ART 1204, Renaissance Architecture; ART 1205, Renaissance Art; ECN 1333, European Economic Development; ENG 1652, Twentieth Century English Literature; HST 1301, Topics in European History; HST 1390, Population in European History; HST 1473, Women in Modern Europe; HST 1481, The Culture of Europe; INT 1321, Modernism; LNF 1521, French Film and Society; LNG 1554, Modern German Film and Literature; LNS 1500, Backgrounds of Spanish Culture; LNS 1550, Spanish Civil War in Spanish Film; POL 1306, Politics in Western Europe; POL 1340, Crisis and Change in Central/Eastern Europe; POL 1343, Politics and Violence in Northern Ireland; POL 1347, Russian Politics After Communism; SOC 1105, Society and Culture in Russia and the Former Soviet Union.

Latin America: AFR 1196, The Black Experience in the Caribbean; HST 1604, Modern Latin America; HST 1605, The Modern Caribbean; INT 1121, Introduction to Latino, Latin American, and Caribbean Studies; LNS 1501, Backgrounds of Latin American Culture; LNS 1511, Introduction to Caribbean Literature; MUS 1184, Music of South America, Latin America, and the Caribbean; POL 1368, Government and Politics of Latin America; SOA 1430, Latin American Society and Development.

Middle East: HST 1612, The Modern Middle East; HST 1613, The Contemporary Middle East; HST 1614, The Middle East Today in Fact, Fiction, and Film; MUS 1182, Music of the Middle East; PHL 1285, Introduction to Jewish Religion and Culture; POL 1345, Government and Politics in the Middle East; POL 1346, Gender in the Middle East.

II Global Dynamics and Development. AFR 1294, Third World Political Relations; ECN 1150, Economics of World Energy and Primary Resources; ECN 1335, International Economics: Finance; ECN 1336, International Economics: Trade; HST 1644, Third World Women; HST 1652, Islam Resurgent; INB 1338, Introduction to International Business; INB 1735, Import and Export Management; PHL 1130, Ethics: East and West; PHL 1137, Philosophical Problems of War and Peace; PHL 1280, Islam; POL 1309, International Political Economy; POL 1338, Religion and Politics; POL 1369, Political Violence; POL 1384, Arab-Israeli Conflict; POL 1386, International Law; POL 1411, Seminar in International Relations; SOA 1120, Camera on Culture; SOA 1310, Global Markets and Local Cultures; SOC 1171, Race and Ethnic Relations: A World Perspective.

Journalism

Nicholas Daniloff, MA, *Professor and Director*

Associate Professors

Charles F. Fountain, MS
William Kirtz, MS
James Ross, MS

Assistant Professors

Jerome M. Berger, MS
Kelley C. Chunn, MS
Laurel Leff, MA
Alan Schroeder, MPA
Linda Conway Tompkins, MA

The School of Journalism prepares students for careers in news media and related fields. The skills it emphasizes—writing, editing, information gathering, photojournalism, and design and graphics—also have broad applications in numerous other disciplines.

The school offers four undergraduate concentrations: advertising, newspaper/print media, public relations, and radio/television news. Students may enroll in either a five-year cooperative education program or a four-year program without co-op. The school strongly advises students to obtain cooperative education experience.

The New England Press Association (NEPA), representing 350 newspaper publishers, maintains its office on the Northeastern campus. Students have the opportunity to attend seminars and conferences sponsored by NEPA and other organizations.

The school seeks to contribute to the existing body of knowledge in journalism and mass communications in areas that help news media practitioners and educators perform their jobs with increasing effectiveness. To that end the school sponsors professional workshops and seminars in cooperation with media and related agencies.

Graduates work for some of the world's best newspapers, radio and television stations, wire services, general and specialized magazines, public relations departments, and advertising agencies.

Each major will complete the journalism core and one of four concentrations.

JRN 1103, JRN 1104, Newswriting I and 2; JRN 1105, Computer-Assisted Reporting; JRN 1206, Editing; JRN 1250, Interpreting the Day's News; JRN 1501, History of Journalism; JRN 1508, Law of the Press; and JRN 1512, Journalism Ethics and Issues.

Concentration in advertising. JRN 1350, Advertising Principles; JRN 1440, Design and Graphics; JRN 1451, Advertising Copy Writing; JRN 1552, Advertising Practice; and one journalism elective.

Concentration in newspaper/print media. JRN 1305, Techniques of Journalism; JRN 1432, Local Government Reporting; JRN 1440, Design and Graphics; JRN 1575, Publication Production and Management; and one journalism elective.

Concentration in public relations. JRN 1336, Public Relations Principles; JRN 1440, Design and Graphics; JRN 1460, Public Relations Problems; JRN 1561, Public Relations Practice; and one journalism elective.

Concentration in radio/television news. JRN 1320, Radio News Gathering and Writing; JRN 1421, Television Newswriting; JRN 1422, Television News Production; JRN 1890, Directed Study; and one journalism elective.

Additional requirements. ENG 1275, Grammar for Journalists; ENG 1110, ENG 1111, Freshman English 1 and 2. One course from this list: ENG 1120, Survey of English Literature 1; ENG 1121, Survey of English Literature 2; ENG 1123, Survey of American Literature 1; ENG 1124, Survey of American Literature 2; and one additional English or American literature elective. POL 1310, American Ideology; POL 1318, State and Local Government; HST 1201, United States to 1877; HST 1202, United States since 1877; ECN 1115, Principles of Macroeconomics; and one additional course in economics or business; MTH 1152, Statistical Thinking; PHL 1200, Introduction to Logic 1; PHL 1140, Social and Political Philosophy; two history electives; and COP 1135, Professional

Bachelor of Arts and Bachelor of Science Curriculum

Development for Journalists. MUS 1109, Introduction to Art, Drama, and Music *or* one course from both of the following categories: (a) ART 1106, Introduction to Art; ART 1220, American Art; (b) MUS 1100, Introduction to Music; MUS 1101, Music as a Listening Experience.

Additional requirements for bachelor of arts. Three courses in science and/or math.

Additional requirements for bachelor of science. Two foreign language courses (at least up to Elementary II level) and four science or computer science courses. Two of the four science courses must be in biology, chemistry, and physics, and at least one of the science courses must be above the elementary level.

Students must also complete the arts and sciences core curriculum (see page 31).

Linguistics

Janet H. Randall, PhD, *Associate Professor and Coordinator of Linguistics Program*

Professors

Irene R. Fairley, PhD
English
Harlan Lane, PhD,
Doc. ès Lettres
Psychology
Joanne L. Miller, PhD
Psychology

Associate Professors

John N. Frampton, PhD
Mathematics
Michael R. Lipton, PhD
Philosophy and Religion
Marina McIntyre, PhD
Linguistics
Lynn M. Stephen, PhD
Anthropology

Assistant Professor

Neal Pearlmutter, PhD
Psychology

Lecturers

Jill Carrier, PhD
Linguistics
Elizabeth Oliver, PhD
Linguistics

Linguistics—the science of language—focuses on such issues as how children learn to speak, how we understand and produce language, and how language ties people together. The field also explores how language is structured and represented in the mind, why some people are better than others at acquiring a second language, how sign languages differ from spoken languages, and how language variation and diversity affect education.

Seven departments (African-American Studies, American Sign Language, English, Modern Languages, Philosophy and Religion, Psychology, and Sociology/Anthropology) collaborate to offer a comprehensive Linguistics Program. The courses that each department offers in the program are identifiable by their cross-listed number in the course descriptions section of this book.

Almost all the linguistics courses have been approved for the honors program, and many of the majors and minors are honors program students.

Linguistics students have interesting co-op and foreign study opportunities. Several students have taken advantage of international co-op and study abroad, including an internship program at the Max Planck Institute for Psycholinguistics in the Netherlands. Many students have taken co-ops as research assistants to linguistic scholars, especially in Northeastern's own psycholinguistics laboratories.

Students with backgrounds in linguistics have pursued advanced degrees in fields including law, cognitive science, education, English, interpreting, business, speech pathology, computer science, and linguistics itself. Other graduates have gone on to work in research, translation, special-education, business, computer science, and law.

LIN 1118, Introduction to Language and Linguistics 1; LIN 1215, Symbolic Logic; LIN 1218, Introduction to Language and Linguistics 2; LIN 1220, Introduction to Phonetics and Phonology; LIN 1262, Psychology of Language; LIN 1335, Language and Culture; and LIN 1401, Introduction to Syntax.

Second language requirement. Proficiency through Intermediate 2 level plus two advanced courses. The college language placement procedures determine proficiency in a second language.

Additional courses. Four from the following (and other related courses by permission): LIN 1119, History of the English Language; LIN 1231, African-American English; LIN 1235, Applied Linguistics; LIN 1236, Advanced Applied Linguistics; LIN 1240, Bilingualism; LIN 1245, History of the French Language; LIN 1250, Linguistics of American Sign Language; LIN 1255, History of the Spanish Language; LIN 1260, Introduction to Romance Linguistics; LIN 1263, Nonverbal Communication; LIN 1362, Child Language; LIN 1364, Cognition; LIN 1365, Language and the Brain; LIN 1407, Semantics; LIN 1408, Topics in Linguistics; LIN 1415, African Languages; LIN 1440, Philosophy of Language; and LIN 1564, Laboratory in Cognition.

Lab course. LIN 1562, Laboratory in Psycholinguistics.

Seminar courses. Two from the following: LIN 1661, Seminar in Psycholinguistics; LIN 1662, Seminar in Cognition; LIN 1692, Seminar in Linguistics, and LIN 1693, Seminar in Linguistics.

Practicum course (in fieldwork, interpreting, teaching, etc.). LIN 1801, Directed Study.

In addition, complete the arts and sciences core curriculum (see page 31).

Bachelor of Arts and Bachelor of Science Curriculum

Bachelor of Science Curriculum

Same as the Bachelor of Arts, except that American Sign Language can count toward the second language proficiency requirement.

In addition, complete the arts and sciences core curriculum (see page 31).

Minor Curriculum

A total of six courses is required. LIN 1118, Introduction to Language and Linguistics I; and LIN 1218, Introduction to Language and Linguistics 2.

Plus one from the following: LIN 1220, Introduction to Phonetics and Phonology; LIN 1262, Psychology of Language; and LIN 1401, Introduction to Syntax.

Three courses, not already taken, from the following: LIN 1119, History of the English Language; LIN 1215, Symbolic Logic; LIN 1220, Introduction to Phonetics and Phonology; LIN 1231, African-American English; LIN 1235, Applied Linguistics; LIN 1236, Advanced Applied Linguistics; LIN 1240, Bilingualism; LIN 1245, History of the French Language; LIN 1250, Linguistics of American Sign Language; LIN 1255, History of the Spanish Language; LIN 1260, Introduction to Romance Linguistics; LIN 1262, Psychology of Language; LIN 1263, Nonverbal Communication; LIN 1335, Language and Culture; LIN 1362, Child Language; LIN 1364, Cognition; LIN 1365, Language and the Brain; LIN 1401, Introduction to Syntax; LIN 1407, Semantics; LIN 1408, Topics in Linguistics; LIN 1415, African Languages; LIN 1440, Philosophy of Language; LIN 1562, Laboratory in Psycholinguistics; LIN 1564, Laboratory in Cognition; LIN 1661, Seminar in Psycholinguistics; LIN 1662, Seminar in Cognition; LIN 1692, Seminar in Linguistics; LIN 1693, Seminar in Linguistics; and LIN 1804, Directed Study.

Mathematics

Richard D. Porter, PhD, *Professor and Chair*

Professors

Samuel J. Blank, PhD
Bohumil Cenkl, ScD
Terence J. Gaffney, PhD
Maurice E. Gilmore, PhD
Mark Goresky, PhD
Arshag B. Hajian, PhD
Anthony Iarrobino, PhD
Venkatrama Lakshmibai, PhD
Marc N. Levine, PhD
Mikhail Malutov, PhD
Egon Schulte, PhD
Jayant M. Shah, PhD
Mikhail Shubin, PhD
Gabriel Stolzenberg, PhD
Chuu-Lian Terng, PhD
Jerzy M. Weyman, PhD
Andrei V. Zelevinsky, PhD

Associate Professors

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Stanley J. Eigen, PhD
John N. Frampton, PhD
Eugene H. Gover, PhD
Samuel Gutmann, PhD
Solomon M. Jekel, PhD
Donald R. King, PhD
Nishan Krikorian, PhD
N. V. R. Mahadev, PhD
Alex Martsinkovsky, PhD
Robert C. McOwen, PhD
Mark B. Ramras, PhD
Martin Schwarz, PhD
Thomas O. Sherman, PhD
Alexandru I. Suci, PhD
Gordana G. Todorov, PhD

Assistant Professors

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David Massey, PhD
Carla B. Oblas, MS

Lecturers

Jane E. Devoe, MS
Robert A. Lupi, MS
Peter J. Philiou, MS
Steven W. Olson, ME

Professors Emeriti

Holland C. Filgo, PhD
Alberto R. Galmarino, PhD
Jack Warga, PhD

Mathematics is of ever-increasing importance to our society and everyday life. It has long been the language of science and technology, and provides a rich source of methods for analyzing and solving problems encountered in the physical world. Today, however, mathematics is essential in virtually all fields of human endeavor, including business, the arts, and the social sciences.

The Bachelor of Arts degree requires at least thirteen mathematics courses and three physics courses, in addition to the study of a foreign language; it is appropriate for students who wish a broader liberal arts education. The Bachelor of Science degree requires at least sixteen mathematics courses and three physics courses but no foreign language study; it is more specialized, and it is recommended for those strongly interested in mathematics and science. The department also offers a minor degree in mathematics.

The major programs provide flexibility with elective courses. Students may take advantage of a range of interdisciplinary programs and may join a major in mathematics with one in such fields as computer science, physics, engineering (six different majors), chemistry, biology and economics.

Strong students are accepted in the honors program, and have the option to enroll in honors sections of several of their mathematics courses. All math majors may benefit from co-op opportunities in the scientific business in Boston and elsewhere. Almost every job involves mathematically stimulating work that enables students to find out how math is used in the world around us.

The increasing use of computers in calculus and other mathematics courses gives students significant computer experience. The Mathematics Computer Center, completed in early 1993, is the nucleus of a "mathematical culture" that links students to applications via computer.

Students planning to teach secondary-school mathematics must major in mathematics and take a specific minor in education, which includes coursework and student teaching.

Mathematical training may lead to opportunities in applied research (natural sciences, engineering, economics, management, computer science) as well as in mathematical research, teaching, or industry.

Bachelor of Arts Curriculum

MTH 1140, MTH 1141, MTH 1142, Calculus 1, 2, and 3; MTH 1243, MTH 1244, Calculus 4 and 5; MTH 1245, MTH 1246, Differential Equations 1 and 2; MTH 1238, Combinatorial Mathematics; MTH 1301, Linear Algebra; MTH 1311, Analysis 1; and three approved mathematics electives selected in consultation with an adviser.

PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3.

In addition, complete the arts and sciences core curriculum (see page 31).

Bachelor of Science Curriculum

MTH 1140, MTH 1141, MTH 1142, Calculus 1, 2, and 3; MTH 1243, MTH 1244, Calculus 4 and 5; MTH 1245, MTH 1246, Differential Equations 1 and 2; MTH 1238, Combinatorial Mathematics; MTH 1301, Linear Algebra; MTH 1311, Analysis 1; and six approved mathematics electives selected in consultation with an adviser.

PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3.

In addition, complete the arts and sciences core curriculum (see page 31).

Minor Curriculum

Eight MTH courses, of which the following four are required: three courses in calculus (MTH 1140, MTH 1141, MTH 1142, or equivalent); and MTH 1238, Combinatorial Mathematics. (MTH 1137 and MTH 1237 together are permitted to substitute for MTH 1238. If this option is elected, then nine courses are required for the minor.) The remaining four courses are selected with the assistance of a departmental adviser: a) two must be selected from MTH 1200 or higher courses, e.g., MTH 1225, MTH 1236, MTH 1230, or MTH 1384 (these two courses may be required by the student's major program); b) the other two must be selected from MTH 1301–1399 and may **not** be among those required by the student's major program (MTH 1384 cannot be counted by many engineering majors and MTH 1301 cannot be counted by computer science majors; MTH 1301 cannot be counted at all if MTH 1230 is already counted in "a," above).

Modern Languages

Robert B. Modee, MA, *Assistant Professor and Acting Chair*

Professors

Inez Hedges, PhD
Neil A. Larsen, PhD
Constance H. Rose, PhD
Stephen A. Sadow, PhD

Associate Professors

Lillian Bulwa, PhD
Walter M. Gershuny, PhD
Juliette M. Gilman, PhD
Bonnie S. McSorley, PhD
Holbrook C. Robinson, PhD
John Spiegel, PhD

The study of modern languages can benefit all students, regardless of their majors. The multicultural world in which we live requires increased communication among varied and often divergent cultures. Learning a new language and its culture enables students to cross cultural barriers and to achieve a more cosmopolitan, open-minded, and sensitive view of the world.

The rationale behind all the majors in the department is the same: to ensure that students become as fluent as possible in a given language, and to introduce them to the relevant culture of that language. For this reason, the students take a number of language classes as well as literature, cinema, and general civilization courses. In addition, students are urged to consider participating in international co-op, which prepares students to function on an everyday level in a foreign country.

The major in modern languages is available in French and Spanish; it is also possible with special departmental permission to pursue a major in Italian, Russian, and German. Where possible, it is preferable to minor in Italian, Russian, or German, since smaller numbers of advanced courses are routinely offered by the department in these languages than in French and Spanish. The majors in French and Spanish are outlined below.

A major in a modern language can form the basis for careers in teaching at the elementary, secondary, or college level; international business relations; high-tech fields; government service; journalism; library science; world affairs; travel; and community service, especially in Spanish-speaking areas.

Bachelor of Arts in French Curriculum

LNF 1201, Intensive Review of French, LNF 1202, LNF 1203, and LNF 1204, French Composition Conversation 2, 3, and 4; LNF 1512, Masterpieces of Modern European Fiction; LNF 1231 and LNF 1232, Masterpieces of French Literature 1 and 2; LNF 1225, Introduction to the French Speaking World; LNF 1309, LNF 1310, LNF 1311 and LNF 1312, French Literature of the Nineteenth through Twentieth Centuries; ENG 1118, Introduction to Linguistics; and LNL 1260, Introduction to Romance Linguistics. As an ancillary course, students are encouraged to take at least one elective pertaining to France.

**Bachelor of Arts in
Spanish Curriculum**

Group I: LNS 1203 and LNS 1204, Composition and Conversation 3 and 4. Group II (prerequisite LNS 1204): LNS 1231, LNS 1232, Masterpieces of Spanish Literature 1 and 2; LNS 1316, Latin American Literature 2. Group III: LNS 1500, Backgrounds of Spanish Culture or LNS 1501, Backgrounds of Latin American Culture. Group IV (prerequisites Groups I and II), take four: LNS 1301, Medieval Literature; LNS 1303, 15th and 16th Century Literature; LNS 1306, Golden Age Theater; LNS 1309, LNS 1310, 19th Century Literature 1 and 2; LNS 1311, LNS 1312, 20th Century Literature 1 and 2; LNS 1315, Latin American Literature 1; LNS 1506, Cervantes; LNS 1511, Caribbean Literature. Group V, open electives: LNL 1235, Applied Linguistics; LNL 1250, Introduction to Romance Linguistics; LNS 1260, History of the Spanish Language; LNS 1400, Spanish Seminar (topic varies); LNS 1510, Saints and Sinners; LNS 1512, Don Juan; LNS 1550 Spanish Civil Wars in Spanish Film. Ancillary courses: Two courses from the social sciences pertaining to Latin America, Latino Studies or Europe and one course in linguistic reasoning.

Minor Curriculum

Six advanced courses (above 104 level); two courses in composition and conversation; one of the Masterpieces of Literature series (1231, 1232); one culture course; and two electives.

Since the German, Italian, and Russian sections of the department have limited course offerings, students are advised to begin their study of these languages as early as possible, and to coordinate carefully their programs with their language adviser.

Music

David D. Sonnenschein, DMA, *Associate Professor and Chair*

Professors

Joshua R. Jacobson, DMA
Roland L. Nadeau, MM
Judith Tick, PhD

Associate Professors

William Lowe, MA
Dennis H. Miller, DMA
Bruce Ronkin, DMA

Assistant Professors

Susan Asai, PhD
Leonard L. Brown, PhD
Leon C. Janikian, MM

Lecturers

Marjorie J. Atlas, MM
Paul Beadoin, MM
Cornelia E. Boniface, MBA

Douglas F. Durant, PhD
Virginia Eskin, BA
Allen G. Feinstein, MM
Michelle L. Gorove, JD
Karen L. Pokross, EdM
Andrew J. Rega, BM
Jeanne M. Segal, MM
Robert Ward, MM

The music department approaches the study and performance of music from a global perspective. The multicultural treatment of the musical arts expands on Western civilization's achievements and affirms that the music of other civilizations, with different musical traditions, is equally worthy of performance and serious study.

The department offers three concentrations in the context of a broad liberal arts program. The music industry concentration is the first such undergraduate program in Boston. It is designed for students with an interest in artist management, marketing and promotion, contracting and legal issues, the recording process, and studio techniques. Developed in collaboration with Northeastern's College of Business Administration, the music industry concentration leads to a Bachelor of Science degree.

The two other concentrations lead to Bachelor of Arts degrees. The music literature concentration has a historical orientation, while the program in music literature and performance combines history with hands-on music making. Students must audition for the music literature and performance program. This program may be especially useful for students working toward a Massachusetts teaching certification, which requires a major in an arts and sciences discipline.

Through an exchange program, students may attend classes at the New England Conservatory of Music. Students also share an array of high-tech and multimedia equipment.

While some music courses are designed for music majors, the department also offers elective survey courses. Several of these courses fulfill the College of Arts and Sciences core curriculum requirement.

An extensive concert series offers a variety of performances by students, faculty, and guest artists. Students also have the opportunity to participate in our active choral groups, bands, and chamber ensembles.

**Bachelor of Arts
Curriculum**

Concentration in music literature. MUS 1107, Principles of Music Literature; MUS 1200, Fundamentals of Theory; MUS 1201, MUS 1202, MUS 1203, MUS 1204, Music Theory 1, 2, 3, and 4; MUS 1241, Piano 1; either MUS 1301, MUS 1302, Form and Analysis 1 and 2; or MUS 1211, Sight Singing and MUS 1250, Conducting; MUS 1171, Computer Literacy for Musicians; MUS 1421, MUS 1422, MUS 1423, MUS 1424, and MUS 1425, Historical Traditions 1, 2, 3, 4, and 5. Also take HST 1102, Western Civilization 2.

In addition, complete the arts and sciences core curriculum (see page 31).

Concentration in music literature and performance. MUS 1107, Principles of Music Literature; MUS 1200, Fundamentals of Theory; MUS 1201, MUS 1202, MUS 1203, MUS 1204, Music Theory 1, 2, 3, and 4; MUS 1241, Piano 1; either MUS 1301 and 1302, Form and Analysis 1 and 2; *or* MUS 1211, Sight Singing and MUS 1250, Conducting; MUS 1461, Applied Music Lessons (every quarter); MUS 1171, Computer Literacy for Musicians; MUS 1421, MUS 1422, MUS 1423, MUS 1424, and MUS 1425, Historical Traditions 1, 2, 3, 4, and 5. Also take HST 1102, Western Civilization 2.

Students preparing for the Massachusetts Music Teaching Provisional Certification have to add the following courses: ED 1306, Measurement and Evaluation; ED 1412, Fundamentals of Curriculum Development; (NEC) Music Education Orientation; (NEC) ED 413, Teaching Choral Music; (NEC) ED 417, Teaching Instrumental Music; (NEC) ED 332, Teaching Classroom Music II; (NEC) ED 533, Philosophy of Music Education; (NEC) ED 461, Practice Teaching Seminar; and (NEC) ED 463, Practice Teaching.

Students in both concentrations must participate in at least one Northeastern University performing ensemble every quarter.

In addition, complete the arts and sciences core curriculum (see page 31).

Bachelor of Science Curriculum

Concentration in music industry. MUS 1107, Principles of Music Literature; MUS 1200, Fundamentals of Theory; MUS 1201, MUS 1202, MUS 1203, Music Theory 1, 2, and 3; MUS 1171, Computer Literacy for Musicians; MUS 1421 and MUS 1425, Historical Traditions 1 and 5; any two of the following: MUS 1422, MUS 1423, MUS 1424, Historical Traditions 2, 3, and 4; MUS 1165 and MUS 1166, Music Industry 1 and 2; MUS 1365, Seminar in the Music Industry. Choose five music industry electives from: MUS 1167, Music Administration; MUS 1172, The Recording Studio; MUS 1173, The Recording Studio 2; MUS 1174, Music Production for Radio; MUS 1360, Artist Management; MUS 1362, Music Merchandising; MUS 1366, Copyright Law for Musicians; MUS 1367, Computer Applications in Music Business; ECN 1363, Economics of Art and Culture. Additional electives are planned.

ECN 1115, Principles of Macroeconomics; ECN 1116, Principles of Microeconomics. One of the following three pairs of courses in descriptive and inferential statistics: MTH 1387 and 1390; ECN 1250 and 1251; POL 1301 and 1302. MGT 1115, Introduction to Business; ACC 1111, Introduction to Accounting. Two of the following business courses: FIN 1438, Introduction to Finance; MKT 1435, Introduction to Marketing; HRM 1432, Organizational Behavior; MSC 1441, Operations Management; ENT 1330, Management of Smaller Enterprises; HST 1102, Western Civilization 2.

Students must participate in at least one Northeastern University performing ensemble during at least four of their quarters on campus.

In addition, complete the arts and sciences core curriculum (see page 31).

Music teacher program. The Music department at Northeastern University and the New England Conservatory of Music have launched a coordinated Music Teacher Preparation Program. This comprehensive program, designed to meet the new Massachusetts state certification requirements, will prepare students for the music teaching profession. In accordance with the new state certification requirements, music teachers must earn a BA in music for provisional certification and a master's degree for standard certification. This new undergraduate program is a synthesis of Northeastern University's existing Music Literature and Performance major and a battery of New England Conservatory of Music Education courses as well as practice teaching (practicum). This program will lead to a Northeastern University BA degree in music with Massachusetts teacher certification (recognized by most states). Because enrollments are limited, the program should be considered to be competitive. For additional information and audition requirements for the BA in music, contact: Professor David Sonnenschein, Chair, Music Department, 351 Ryder Hall, 360 Huntington Avenue, Boston, MA 02115.

Minor Curriculum

General music track. MUS 1200, Fundamentals of Music; MUS 1201, Music Theory 1; MUS 1202, Music Theory 2; MUS 1241, Piano 1 *or* MUS 1209, Functional Piano; MUS 1100, Introduction to Music *or* MUS 1107, Principles of Music; and a music history course.

Music theatre track. MUS 1200, Fundamentals of Music; MUS 1201, Music Theory 1; MUS 1100, Introduction to Music; MUS 1211, Sightsinging; MUS 1244, Voice Class 1; INT 1110, American Musical Theatre *or* MUS 1132, Introduction to Opera; MUS 1100, Introduction to Music *or* MUS 1107, Principles of Music; and the following courses four times each: MUS 1261, Voice Lessons and MUS 1230, Chorus.

Music industry track. MUS 1200, Fundamentals of Music; MUS 1201, Music Theory 1; MUS 1165, Music Industry 1; MUS 1166, Music Industry 2; MUS 1241, Piano Class 1 *or* MUS 1209, Functional Piano; MUS 1100, Introduction to Music *or* MUS 1107, Principles of Music; MUS 1170, Music and Technology *or* MUS 1171, Computer Literacy for Musicians; and two approved music industry electives.

Philosophy and Religion

Susan M. Setta, PhD, *Associate Professor and Chair*

Professor

Stephen L. Nathanson, PhD

Associate Professors

William J. DeAngelis, PhD

Michael Lipton, PhD

Gordon E. Pruett, PhD

Lecturers

Margaret C. Huff

Michael C. Meyer, PhD

Assistant Professor

Patricia Illingworth, JD, PhD

Philosophy addresses questions and theories related to art, religion, morality, society, and natural and social sciences. The study of philosophy challenges students to examine through critical reflection their beliefs in many areas.

Courses aim to provide students with an understanding of the methods and traditions of philosophical and religious thought. Through readings, discussion, and writing, students examine questions concerning the nature and validity of religious beliefs, moral judgments, and scientific theories as well as questions about values and social policy in such areas as law, medicine, and technology.

Coursework in philosophy can strengthen the student's work in other areas. Philosophy majors enter diverse careers, ranging from college-level teaching to law. The program strives to help students sharpen their critical abilities, thereby enhancing their preparation for graduate or professional study.

Bachelor of Arts and Bachelor of Science Curriculum

PHL 1200, Introduction to Logic 1; PHL 1225, Ancient Philosophy; PHL 1230, History of Modern Philosophy; PHL 1400, Theory of Knowledge *or* PHL 1405, Metaphysics *or* PHL 1335, Moral Philosophy; PHL 1290, Cults and Sects *or* PHL 1345, Philosophy of Religion; three of the following: PHL 1100, Introduction to Religion; PHL 1275, Eastern Religions; PHL 1280, Islam; PHL 1315, Understanding *The Bible*; and five philosophy and religion electives to bring the total number of quarter hours in the major to fifty-two.

In addition, complete the arts and sciences core curriculum (see page 31).

Minor Curriculum

PHL 1100, Introduction to Philosophy 1 *or* PHL 1105, Introduction to Scientific Method; PHL 1225, Ancient Philosophy *or* PHL 1230, History of Modern Philosophy; PHL 1200, Introduction to Logic 1 *or* PHL 1215, Symbolic Logic; one of the following: PHL 1435, Philosophy of Mind; PHL 1400, Theory of Knowledge; PHL 1405, Metaphysics; and PHL 1335, Moral Philosophy; and three philosophy electives.

Concentration in law and ethics. Designed for the philosophy major seeking a career in law, the concentration focuses on the areas of law, social and political philosophy, and applied ethics. The concentration structures the electives so that the student's major serves both the fields of philosophy and those traditionally considered pre-law.

Concentration in religious studies. Designed for philosophy majors seeking a career in religious studies, this concentration focuses on providing competency in comparative religion, textual analysis, and methodology. Through the concentration in religious studies, the students will understand the basic theologies, practices, and ethical system of several of the world's larger faith traditions.

Physics

Paul M. Champion, PhD, *Professor and Chair*

Professors

Ronald Aaron, PhD

Petros N. Argyres, PhD

Arun Bansil, PhD

Alan H. Cromer, PhD

David A. Garelick, PhD

Haim Goldberg, PhD

Jorge V. José, PhD

Robert S. Markiewicz, PhD

Pran Nath, PhD

Clive H. Perry, PhD

Stephen Reucroft, PhD

Carl A. Shiffman, PhD

Jeffrey B. Sokoloff, PhD

Yogendra N. Srivastava, PhD

Michael T. Vaughn, PhD

Eberhard von Goeler, PhD

Allan Widom, PhD

Fa Yueh Wu, PhD

Associate Professors

George O. Alverson, PhD

Alain S. Karma, PhD

Jacqueline Krim, PhD

Marie E. Machacek, PhD

Srinivas Sridhar, PhD

Tomasz Taylor, PhD

Assistant Professors

Nathan Israeloff, PhD

J. Timothy Sage, PhD

John D. Swain, PhD

Darien Wood, PhD

Professors Emeriti

William L. Faissler, PhD

Marvin H. Friedman, PhD

Michael J. Glaubman, PhD

Walter Hauser, PhD

Bertram J. Malenka, PhD

Eugene J. Saletan, PhD

Physics examines the fundamental principles that govern natural phenomena, ranging in scale from collisions of subatomic particles, through the behavior of solids, liquids, and biomolecules, to exploding stars and colliding galaxies.

The program aims to help students experience the intellectual stimulation of studying physics and astrophysics and the excitement of front-line research; understand the basic principles and techniques of physics-related careers; and prepare for graduate study in physics or related fields.

The department offers four levels of undergraduate courses: descriptive courses for non-science majors with limited mathematical background; general survey courses for students in scientific and engineering fields; advanced courses primarily intended for physics majors; and highly advanced courses primarily intended for prospective graduate students.

In addition to work in industrial, government, or high-technology laboratories in areas of applied physics, students may find opportunities in such fields as biophysics, computer science, geophysics, medical and radiation physics, and engineering. Many physics majors pursue advanced degrees in physics and related fields.

Bachelor of Arts Curriculum

PHY 1221, PHY 1222, PHY 1223, PHY 1224, Physics for Science and Engineering Students 1, 2, 3, and 4, and associated labs PHY 1521, PHY 1522, PHY 1533; PHY 1300, Computer Physics; PHY 1302, Electric and Magnetic Fields; three upper-level physics lecture courses, and three upper-level lab courses.

MTH 1140, MTH 1141, MTH 1142, MTH 1243, MTH 1244, Calculus for Science Majors 1, 2, 3, 4, and 5, and one advanced mathematics elective.

In addition, complete the arts and sciences core curriculum (see page 31).

Bachelor of Science Curriculum

PHY 1221, PHY 1222, PHY 1223, PHY 1224, Physics for Science and Engineering Students 1, 2, 3, and 4, and associated labs PHY 1521, PHY 1522, PHY 1533; PHY 1300, Computer Physics; PHY 1302, Electric and Magnetic Fields; PHY 1304, Mathematical Physics; PHY 1305, Thermodynamics and Kinetic Theory; PHY 1401, Classical Mechanics; PHY 1402, PHY 1403, Electricity and Magnetism 1 and 2; PHY 1404, Wave Motion and Optics; PHY 1415, Quantum Mechanics 1; and three upper-level lab courses.

MTH 1140, MTH 1141, MTH 1142, MTH 1243, MTH 1244, Calculus for Science Majors 1, 2, 3, 4, and 5; MTH 1245, MTH 1246, Differential Equations 1 and 2; and five additional science electives from those approved for majors in the following fields: physics, mathematics, computer science, chemistry, engineering, biology, and geology.

In addition, complete the arts and sciences core curriculum (see page 31).

Bachelor of Science in Applied Physics Curriculum

PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3, and associated labs; PHY 1521, PHY 1522, PHY 1533; PHY 1301, Intermediate Mechanics; PHY 1302, Electric and Magnetic Fields; PHY 1303, Modern Physics; PHY 1305, Thermodynamics and Kinetic Theory; PHY 1404, Wave Motion and Optics; PHY 1551 and PHY 1552, Electronics for Scientists 1 and 2; PHY 1555, Wave Lab; PHY 1557, Advanced Lab; and PHY 1561, Project Lab.

MTH 1140, MTH 1141, MTH 1142, Calculus 1, 2, and 3; MTH 1243, MTH 1244, Calculus 4 and 5; MTH 1245, MTH 1246, Differential Equations 1 and 2.

COM 1100, Fundamentals of Computer Science; COM 1101, Algorithms and Data Structures 1; and COM 1201, Data Structures 2. Four additional electives from those approved for majors in the following fields: physics, mathematics, chemistry, computer science, engineering, biology, and geology.

In addition, complete the arts and sciences core curriculum (see page 31).

Minor in Physics Curriculum

PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3, and three upper-level lecture or lab courses from the following list: PHY 1301, PHY 1302, PHY 1303, PHY 1304, PHY 1305, PHY 1401, PHY 1402, PHY 1403, PHY 1404, PHY 1411, PHY 1412, PHY 1413, PHY 1414, PHY 1415, PHY 1416, PHY 1551, PHY 1552, and PHY 1555.

Minor in Instrumentation for Science Curriculum

The minor offers experience in the use of common laboratory instruments, the taking and analysis of data, and elementary skills in electronics. A primary goal of the minor is to prepare the student to design and construct relatively small-scale purpose measurement instrumentation.

Required courses: PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3; PHY 1555, Wave Laboratory; and PHY 1551, PHY 1552, Electronics for Scientists 1 and 2.

Political Science

Christopher J. Bosso, PhD, *Associate Professor and Chair*

Professors

Michael A. Baer, PhD
Robert L. Cord, PhD
Robert E. Gilbert, PhD
William F. S. Miles, PhD
Suzanne P. Ogden, PhD
David A. Rochefort, PhD
David E. Schmitt, PhD

Distinguished Professor

Michael S. Dukakis, JD

Thomas P. O'Neill Chair in Public Life

William Crotty, PhD

Associate Professors

L. Gerald Bursey, PhD
Minton F. Goldman, PhD
William D. Kay, PhD
Eileen L. McDonagh, PhD
John H. Portz, PhD
Denis J. Sullivan, PhD
Michael C. Tolley, PhD

Assistant Professors

Leslie E. Armijo, PhD
Richard A. Loverd, PhD
William G. Mayer, PhD
Bruce A. Wallin, PhD

Political science majors study the art and science of politics, the structure and functions of government, political behavior, and public policy making. Political science is broad and interdisciplinary by nature, so students will learn about the political and policy dimensions of societies, economic systems, and cultures, today and across time, both in the United States and in other nations.

Political science majors can choose from a wide array of courses in American politics, international relations, comparative politics, public administration, and political theory. Majors can follow a general studies path, selecting from among electives as they go along, or they can pursue more structured and more specialized concentrations in law and legal issues, international and comparative politics, or public policy and administration.

Approximately half the majors participate in the cooperative education program, with placements in state and federal government agencies, law firms, nonprofit institutions, and corporations. Most students complete either a co-op position or an internship with a congressional representative, a senator, a governor, or other elected public servant.

Students may also participate in extracurricular programs designed to expand their leadership ability, such as Project Vote Smart, the Model United Nations, the Model Arab League, the student government, or the College Democrats or College Republicans. Many students study abroad in one of the college's international programs, such as the Irish Studies program, which includes an internship in the Irish Parliament. Qualified students may be selected for the honors program and join the activities of the political science honor society.

A major in political science helps prepare students for law school, graduate school, and careers in the government and the nonprofit sector, as well as for teaching, journalism, legislative or lobbying positions, public relations activities, and work in international corporations.

POL 1110, Introduction to Politics; POL 1111, Introduction to American Government; POL 1112, Introduction to International Relations; POL 1113, Introduction to Foreign Governments; POL 1261, Public Administration; one political theory course (POL 1373, Pre-Modern Thought; POL 1374, Modern Political Thought; *or* POL 1378, Contemporary Political Thought); experiential education requirement; and seven political science electives.

Six social science electives selected from at least three of the following areas: African-American studies, anthropology, economics, history, psychology (consult the political science department's approved psychology course list), and sociology.

In addition, complete the arts and sciences core curriculum (see page 31).

Concentration in law and legal issues. POL 1110, Introduction to Politics; POL 1111, Introduction to American Government; POL 1112, Introduction to International Relations; POL 1113, Introduction to Foreign Governments; POL 1261, Public Administration; one political theory course (POL 1373, Pre-Modern Political Thought *or* POL 1374, Modern Political Thought *or* POL 1378, Contemporary Political Thought); experiential education requirement; six law and legal issues electives; and one general political science elective.

Six social science electives selected from at least three of the following areas: African-American studies, anthropology, economics, history, psychology (consult the political science department's approved psychology course list), and sociology.

In addition, complete the arts and sciences core curriculum (see page 31).

Concentration in public policy and administration. POL 1110, Introduction to Politics; POL 1111, Introduction to American Government; POL 1112, Introduction to International Relations; POL 1113, Introduction to Foreign Governments; POL 1261, Public Administration; one political theory course (POL 1373, Pre-Modern Thought; POL 1374, Modern Political Thought; *or* POL 1378, Contemporary Political Thought); experiential education requirement; POL 1260, Public Policy; and six public policy and administration electives.

Bachelor of Arts Curriculum

Six social science electives selected from at least three of the following areas: African-American studies, anthropology, economics, history, psychology (consult the political science department's approved psychology course list), and sociology.

In addition, complete the arts and sciences core curriculum (see page 31).

Bachelor of Science Curriculum

POL 1110, Introduction to Politics; POL 1111, Introduction to American Government; POL 1112, Introduction to International Relations; POL 1113, Introduction to Foreign Governments and Societies; POL 1261, Public Administration; one political theory course (POL 1373, Pre-Modern Thought; POL 1374, Modern Political Thought, *or* POL 1378, Contemporary Political Thought); POL 1301, POL 1302, Research Methods 1 and 2; experiential education requirement; and six political science electives.

Six social science electives selected from at least three of the following areas: African-American studies, anthropology, economics, history, psychology (consult the political science department's approved psychology course list), and sociology.

In addition, complete the arts and sciences core curriculum (see page 31).

Concentration in law and legal issues. POL 1110, Introduction to Politics; POL 1111, Introduction to American Government; POL 1112, Introduction to International Relations; POL 1113, Introduction to Foreign Governments; one political theory course (POL 1373, Pre-Modern Thought; POL 1374, Modern Political Thought; *or* POL 1378, Contemporary Political Thought); POL 1261, Public Administration; POL 1301, POL 1302, Research Methods 1 and 2; experiential education requirement; six law and legal issues electives; and two general political science electives.

Six social science electives selected from at least three of the following areas: African-American studies, anthropology, economics, history, psychology (consult the political science department's approved psychology course list), and sociology.

In addition, complete the arts and sciences core curriculum (see page 31).

Concentration in public policy and administration. POL 1110, Introduction to Politics; POL 1111, Introduction to American Government; POL 1112, Introduction to International Relations; POL 1113, Introduction to Foreign Governments; POL 1261, Public Administration; one political theory course (POL 1373, Pre-Modern Thought; POL 1374, Modern Political Thought; *or* POL 1378, Contemporary Political Thought); POL 1301, POL 1302, Research Methods 1 and 2; experiential education requirement; POL 1260, Public Policy; and five public policy and administration electives.

Six social science electives selected from at least three of the following areas: African-American studies, anthropology, economics, history, psychology (consult political science department's approved psychology course list), and sociology.

In addition, complete the arts and sciences core curriculum (see page 31).

Minor Curriculum

Any two of the following courses: POL 1110, Introduction to Politics; POL 1111, Introduction to American Government; POL 1112, Introduction to International Relations; POL 1113, Introduction to Foreign Governments; POL 1261, Public Administration. Any five additional courses offered by the Department of Political Science for political science majors, including courses listed above that have not been selected to fulfill the above requirement.

Minor in International Politics Curriculum

POL 1112, Introduction to International Relations; POL 1113, Introduction to Foreign Governments; any five additional courses in international politics and/or comparative politics offered by the Department of Political Science.

Psychology

James R. Stellar, PhD, *Professor and Chair*

Professors

Judith A. Hall, PhD
Stephen G. Harkins, PhD
Leon J. Kamin, PhD
Harlan L. Lane, PhD,
Doc. ès Lettres
Harry A. Mackay, PhD
Joanne L. Miller, PhD
Adam J. Reeves, PhD
Alexander A. Skavenski, PhD
Harold S. Zamansky, PhD

Associate Professors

Martin L. Block, PhD
Perrin S. Cohen, PhD
Rhea T. Eskew, PhD
Charles Karis, PhD

Assistant Professors

David J. Bryant, PhD
Jane A. Bybee, PhD
Elizabeth Cole, PhD
C. Randall Colvin, PhD
Denise Jackson, PhD
Frank Naarendorp, PhD
Neal Pearlmutter, PhD

Psychology is the study of human and animal behavior and the ways people think. An interdisciplinary science, psychology includes methods and knowledge derived from the other natural and social sciences.

The psychology curriculum explores such topics as how brain function determines behavior; how we see, hear, and learn; what constitutes abnormal personality; how people develop emotionally and cognitively; and how individuals work in groups. Through laboratory practice and experimentation, individual research projects, and small-group seminars, the program encourages critical evaluation of psychology's accomplishments and its future.

The Bachelor of Arts degree is intended for students who wish to pursue a broad liberal arts education that explores the humanities, the social sciences, and, to a lesser extent, the natural sciences. The Bachelor of Science degree is more specialized and is usually recommended for students who have a strong scientific interest in psychology and the natural sciences.

The psychology department offers honors sections of introductory psychology, as well as honors activities in other courses. All students are eligible for directed study courses, which are individualized study or research experiences under the supervision of a faculty member. Co-op placements are based in both community (often mental health) and laboratory settings.

A solid scientific background in psychology helps prepare students for careers in teaching, business, public service, or research and provides a foundation for graduate study in all areas of psychology, including clinical, as well as in law and medicine.

Bachelor of Arts and Bachelor of Science Curriculum

PSY 1110, Perspectives in Psychology 1 *or* PSY 1111, Foundations of Psychology 1; PSY 1112, Foundations of Psychology 2 *or* PSY 1113, Perspectives in Psychology 2; PSY 1211 and PSY 1212, Statistics in Behavioral Science 1 and 2. Students in PSY 1111 and PSY 1112 are normally required to participate as research subjects in experiments conducted by department faculty.

Two courses from the following: PSY 1271, Social Psychology; PSY 1272, Personality 1 *or* PSY 1373, Abnormal Psychology 1; and PSY 1241, Human Behavioral Development 1. Three courses from the following: PSY 1262, Psychology of Language *or* PSY 1364, Cognition; PSY 1231, Learning and Motivation; PSY 1351, Psychobiology; and PSY 1381, Sensation *or* PSY 1382, Perception.

Within the psychology department, students may concentrate their electives in a variety of subareas, including language and cognition; learning and motivation; personality and social psychology; sensory and psychobiology; or individual study. Students should see a department adviser regarding these concentrations.

Additional requirements for Bachelor of Arts: Four psychology electives; *either* three psychology labs *or* two psychology labs and one psychology directed study; one psychology seminar.

Additional requirements for Bachelor of Science: Seven psychology electives; *either* four psychology labs *or* three psychology labs and one psychology directed study; one psychology seminar. Four mathematics, science, or computer science courses beyond the core curriculum requirements. Also, one humanities course beyond the core curriculum requirements.

Students must also complete the arts and sciences core curriculum (see page 31).

Minor Curriculum

PSY 1110, Perspectives in Psychology 1 *or* PSY 1111, Foundations of Psychology 1; PSY 1112, Foundations of Psychology 2 *or* PSY 1113, Perspectives in Psychology 2; and PSY 1211, PSY 1212, Statistics in Behavioral Science 1 and 2.

Two courses from the following: PSY 1271, Social Psychology; PSY 1272, Personality 1 *or* PSY 1373, Abnormal Psychology 1; PSY 1241, Human Behavioral Development 1; PSY 1262, Psychology of Language *or* PSY 1364, Cognition; PSY 1231, Learning and Motivation; PSY 1351, Psychobiology; and PSY 1381, Sensation *or* PSY 1382, Perception.

Four psychology electives.

Sociology and Anthropology

T. Anthony Jones, PhD, *Associate Professor and Chair*

Professors

Arnold Arluke, PhD
Winifred Breines, PhD
Michael E. Brown, PhD
Morris Freilich, PhD
Christine Gailey, PhD
Debra R. Kaufman, PhD
Alan M. Klein, PhD
Elliott A. Krause, PhD
Jack Levin, PhD
Ronald J. McAllister, PhD
Earl Rubington, PhD

Associate Professors

Michael Blim, PhD
Richard Bourne, PhD
Luis M. Falcon, PhD
Wilfred E. Holton, PhD
Maureen Kelleher, PhD
Thomas H. Koenig, PhD
Carol A. Owen, PhD
Judith Perrolle, PhD
Thomas M. Shapiro, PhD
Lynn Stephen, PhD

Assistant Professors

Daniel R. Faber, PhD
Gordana Rabrenovic, PhD

Professor Emeritus

Morton Rubin, PhD

Sociology and anthropology provide the critical perspective needed for studying the social arrangements in which people live, in particular for understanding how societies function, for studying the

conditions under which people change society, and for describing the modes and conditions of cooperation that make social life possible.

Courses in the program examine such areas as gender, race, class, cities, conflict, law and crime, multiculturalism and intercultural relations, technology and the environment, education, media, and the comparative interdisciplinary analyses of societies. Many courses are directly relevant to majors in other fields, including economics, political science, philosophy, literature, criminal justice, and business.

A major in sociology or anthropology helps prepare students for careers in public or private service, including such fields as law, teaching, social work, administration or management, and research.

Bachelor of Arts in Sociology Curriculum

SOC 1100, Introduction to Sociology; SOA 1100, Peoples and Cultures; SOC 1320, Introduction to Statistical Analysis; SOC 1321, SOC 1322, Research Methods 1 and 2; SOC 1300, Classical Social Thought; SOC 1301, Current Social Thought; SOC 1310, Class, Power, and Social Change; two intermediate courses (1100 or 1200 level); two advanced courses (1300, 1400, or 1500 level); and one anthropology course beyond SOA 1100. Six electives in the social sciences other than sociology/anthropology.

In addition, complete the arts and sciences core curriculum (see page 31).

Bachelor of Science in Sociology Curriculum

SOC 1100, Introduction to Sociology; SOA 1100, Peoples and Cultures; SOC 1320, Introduction to Statistical Analysis; SOC 1321, SOC 1322, Research Methods 1 and 2; SOC 1300, Classical Social Thought; SOC 1301, Current Social Thought; SOC 1310, Class, Power, and Social Change; two intermediate courses (1100 or 1200 level); two advanced courses (1300, 1400, or 1500 level); and one anthropology course beyond SOA 1100. Six electives in the social sciences other than sociology/anthropology. Six additional electives.

In addition, complete the arts and sciences core curriculum (see page 31).

Minor in Sociology Curriculum

SOC 1100, Introduction to Sociology; any two courses from among the following: SOC 1321, Research Methods 1; SOC 1322, Research Methods 2; SOC 1300, Classical Social Thought; SOC 1301, Current Social Thought; any three-course specialization in sociology arranged between the student and adviser; and one additional 1300, 1400, or 1500 level course.

Bachelor of Arts in Anthropology Curriculum

SOA 1100, Peoples and Cultures; SOA 1104, Cultures of the World; SOC 1100, Introduction to Sociology; and at least three of the following: SOA 1335, Language and Communication; SOA 1125, Stones and Bones: Prehistory in the New World; SOA 1155, Individual and Culture; SOA 1301, Human Origins; SOA 1160, Sex, Sex Roles, and Family; SOA 1425, Cultural Survival; SOA 1146, Rural Workers in the Third World; SOA 1310, Global Markets and Local Cultures; SOA 1470, Myth and Religion; at least six additional anthropology courses; and one sociology elective beyond SOC 1100. Six electives in the social sciences other than sociology/anthropology.

In addition, complete the arts and sciences core curriculum (see page 31).

Bachelor of Science in Anthropology Curriculum

SOA 1100, Peoples and Cultures; SOA 1104, Cultures of the World; SOC 1100, Introduction to Sociology; and at least three of the following: SOA 1335, Language and Communication; SOA 1125, Stones and Bones: Prehistory in the New World; SOA 1155, Individual and Culture; SOA 1301, Human Origins; SOA 1160, Sex, Sex Roles, and Family; SOA 1310, Global Markets and Local Cultures; SOA 1425, Cultural Survival; SOA 1146, Rural Workers in the Third World; SOA 1470, Myth and Religion; at least six additional anthropology courses; and one sociology elective beyond SOC 1100. Six electives in the social sciences other than sociology/anthropology. Four additional electives.

In addition, complete the arts and sciences core curriculum (see page 31).

Minor in Anthropology Curriculum

SOA 1100, Peoples and Cultures; SOA 1104, Cultures of the World; SOA 1335, Language and Communication; SOA 1155, Individual and Culture; SOA 1160, Sex, Sex Roles, and Family; and any two-course specialization in anthropology arranged between the student and adviser.

Theatre

Del Lewis, MFA, *Associate Professor and Chair*

Professor

Edward Bullins, MFA

Associate Professors

Janet L. Bobcean, MFA

Nancy Kindelan, PhD

Jerrold A. Phillips, PhD

Clinical Lecturer

Theodore D. Janello, MA

The study of theatre—as performance, visual expression, text, theory, and history—explores the techniques of creatively imaging or re-imaging the experiences of society and of the individual.

The program at Northeastern balances production theory and practice. In the theatre production laboratory, students (majors and non-majors) are involved in experiential learning that synthesizes the ideas, theories, and practices studied in the classroom. All theatre majors participate in laboratory and public performances.

Bachelor of Arts and Bachelor of Science Curriculum

A theatre major may petition to enter one of three concentrations: performance, production, or generalist. Opportunities exist for independent projects, internships, and co-op experiences.

Theatre majors may pursue advanced study in graduate or professional programs, careers as theatre practitioners, or careers in theatre education.

THE 1100, Introduction to Theatre Arts; THE 1106, THE 1107, Theatre History 1 and 2; THE 1112, Dramatic Theory/Criticism; THE 1114, Masters of Theatre; THE 1149, Script Analysis; THE 1150, Acting 1 (majors section); THE 1180, Concepts of Direction; THE 1200, Stagecraft; THE 1212, Introduction to Theatrical Design; THE 1300, Acting 2; and THE 1800, THE 1801, THE 1802, and THE 1803, Practicum in Production 1, 2, 3, and 4. All theatre majors must take ENG 1658, Introduction to Shakespeare, in the college core curriculum.

All theatre majors should select the following courses in their *freshman* year: (fall quarter) THE 1100, Introduction to Theatre Arts and THE 1200, Stagecraft; (winter quarter) THE 1150, Acting 1 (majors section) and THE 1800, Practicum in Production 1; (spring quarter) THE 1212, Introduction to Theatrical Design and THE 1801, Practicum in Production 2.

After completing 32 quarter hours, theatre majors may choose to be theatre generalists or to concentrate in production or performance. Admission to a concentration is by petition or audition.

Theatre generalist. THE 1116, American Theatre or THE 1121, Contemporary Theatre; THE 1210, Scene Design 1; THE 1226, Lighting for the Stage; THE 1261, Costuming 1; THE 1505, Continental Drama; THE 1510, Twentieth Century Theatre; and four courses from the following group: THE 1140, Playwriting; THE 1160, Movement 1; THE 1280, Stage Makeup; THE 1284, Theatre Management; THE 1325, Musical Theatre Technique; or THE 1410, Technical Production.

Concentration in production. THE 1209, Theatrical Drafting; THE 1210, Scene Design 1; THE 1226, Lighting for the Stage; THE 1261, Costuming 1; THE 1284, Theatre Management; THE 1410, Technical Production; THE 1505, Continental Drama; THE 1510, Twentieth Century Theatre; and two courses from the following: THE 1213, Scene Design 2; THE 1225, Scene Painting; THE 1265, Pattern Drafting; THE 1280, Stage Makeup; THE 1400, Costuming 2; or THE 1430, Lighting 2. All production concentration majors must take electives ART 1101, Art History Since 1400 and ART 1124, Basic Drawing.

Concentration in performance. THE 1116, American Theatre or THE 1121, Contemporary Theatre; THE 1155, Voice for the Theatre; THE 1160, Movement 1; THE 1280, Stage Makeup; THE 1301, THE 1302, Acting 3 and 4; THE 1316, Acting for the Camera; THE 1325, Musical Theatre Technique; THE 1505, Continental Drama; and THE 1510, Twentieth Century Theatre. All performance concentration majors must take 4 quarter hours of dance/physical education electives (HSL).

All students must complete the arts and sciences core curriculum (see page 31).

Minor Curriculum

THE 1100, Introduction to Theatre Arts; THE 1106, THE 1107, Theatre History 1 and 2; THE 1150, Acting 1 (majors section) (winter quarter); THE 1180, Concepts of Direction; THE 1200, Stagecraft; THE 1212, Introduction to Theatrical Design; THE 1800, THE 1801, Practicum in Production 1 and 2; and one of the following: THE 1149, Script Analysis; THE 1210, Scene Design 1; THE 1226, Lighting for the Stage; THE 1261, Costuming 1; and THE 1300, Acting 2. Laboratory practice in technical theatre and performance, in conjunction with the coursework, is required for the minor.

Music majors who wish to minor in musical theatre must take the following courses. THE 1100, Introduction to Theatre Arts; THE 1111, American Musical Theatre; THE 1149, Script Analysis; THE 1150 and THE 1300, Acting 1 (majors section) (winter quarter) and 2; THE 1160, Movement 1; THE 1325, Musical Theatre Technique; THE 1800, THE 1801, THE 1802, and THE 1803, Practicum in Production 1, 2, 3, and 4. Laboratory practice in technical theatre and performance, in conjunction with the coursework, is required.

Bouvé College of Pharmacy and Health Sciences

James J. Gozzo, PhD, *Dean*

Mehdi Boroujerdi, PhD, *Associate Dean for Pharmacy*

Patrick F. Plunkett, EdD, *Associate Dean for Academic Affairs*

Ena Vasquez-Nuttal, EdD, *Associate Dean and Director of the Graduate School*

Anne M. Ahern, MEd, *Director of the Office of Student Services*

Nancy P. Warner, MS, *Academic Counselor*

Carol M. Konis, *Assistant to the Dean*

Barry Kass, MBA, *Director of Continuing Education and Development*

The programs in Bouvé College of Pharmacy and Health Sciences combine cooperative education experiences with highly innovative academic curricula that are designed to meet the demand for well-educated pharmacists and allied health professionals. The college prepares students to become effective professional practitioners, enter graduate schools, and work in many areas responsible for the delivery of health care.

The college offers students a health-care education that features a curriculum of highly relevant and closely integrated basic courses in the physical, biological, behavioral, and administrative sciences; on-site involvement in clinical patient care; a cooperative education work program, including a pharmacy externship-internship period and clinical affiliations in physical therapy and other health professions; and a commitment to the search for and advancement of new and progressive concepts, ideas, and philosophies of education and professional practice.

Each of the programs offered by the college is accredited by the appropriate professional group. The college is a member of the American Association of Colleges of Pharmacy and the Association of Schools of Allied Health Professions.

Class Entrance Requirements

Listed below are the overall quality-point averages required for students to advance to the next rank and to graduate.

Sophomore	1.8
Middler	2.0
Junior	2.0
Senior	2.0
To graduate	2.0

In addition, students are required to attain a grade of C– or better in professional courses (CPS, MLS, PAH [except PAH 1135], PCL, PCT, PHP, PMC, and TOX); and a C or better in professional courses (ATP and PTH). A required course in which an F or W grade is received can be repeated only once. If a grade of D is not considered passing in a professional course, the course can be repeated only once.

Medical laboratory science special requirements. A grade of C– or better must be earned in each professional course (MLS) in the program. To enter professional courses in the sophomore year, you must obtain a minimum quality-point average of 2.0 in all science courses, including mathematics, chemistry, biology, and basic medical laboratory science. To enter professional courses in the middler year, you must have a minimum quality-point average of 2.0 and have earned a C– or better in all professional courses. To enter clinical studies in the junior and senior years, you must have a minimum quality-point average of 2.5 and have earned a C– or better in all professional courses.

To be eligible for graduation, a baccalaureate degree candidate must have completed the specified curriculum with a minimum quality-point average of 2.5 and have earned a C– or better in all professional courses.

Cardiopulmonary sciences special requirements. In addition to the general grade requirement of at least a C– in all professional courses (CPS), students are required to maintain a quality-point average of at least 2.0 in the following professionally related courses to enter quarter 6: BIO 1120, BIO 1140, CHM 1111, CHM 1122, MTH 1107, PAH 1202, PAH 1204, and PHY 1201.

Toxicology special requirements. A grade of C or better is required in each toxicology course. A cumulative quality-point average of 2.0 is required for graduation. Professional electives cannot be taken on a pass/fail basis. An average of 2.5 or better overall is required of all students transferring into the program.

Physical therapy special requirements. During the first two years, physical therapy students must achieve a grade of C or better in each of the prerequisite sciences as well as in each professional course; all deficiencies, if any, must be cleared before a student may progress into the middler year. Beginning with quarter 6, students must achieve a grade of C or better in each professional course to progress to the next academic quarter. In addition, specific academic requirements govern performance in the physical therapy program and department.

Athletic training special requirements. A grade of C or better must be earned in each professional course in the program. A minimum quality point average of 2.0 is required for field experience.

Open Option Program

The Open Option Program is designed for students who are undecided about a profession but are interested in a career in health care. The program offers freshmen a core of courses designed to provide the basic scientific background for each of the professional programs in the college in addition to a one quarter-hour health careers seminar.

Satisfactory completion of all freshman-year courses, including the Open Option core curriculum, is necessary for admission to one of the professional programs of the college. The Open Option plan does not apply to the dental hygiene, pharmacy, and physical therapy programs.

Transfer Credit

The college may accept qualified transfer students who have successfully completed one or more years of preprofessional coursework in an accredited college or university. No student transferring from another college or university may receive a degree unless the last three quarters of academic work immediately preceding graduation have been completed at Northeastern.

Athletic Training

Chad A. Starkey, PhD, *Program Director*

Faculty listed under Physical Therapy

The five-year Bachelor of Science in education program is designed for students interested in careers as athletic trainers. Working under a physician's supervision, athletic trainers are members of the sports medicine field who specialize in the prevention, treatment, and rehabilitation of athletic injuries.

The athletic trainer's duties include advising on proper conditioning techniques to help reduce the chance of injury, assessing the severity of injuries that do occur, applying appropriate treatment to aid the healing process, and supervising post-injury rehabilitation programs. Athletic trainers work with secondary school, college, and professional athletic teams and may be employed in private clinics.

Students may petition for acceptance into the athletic training program after successfully completing their first year of academic study. To be accepted into the program, applicants must maintain at least a 2.0 quality-point average during their first year. Students must achieve a grade of C (2.0) or better in all professional courses and all basic science courses. In order to complete the athletic training program, students must complete a minimum of 1,300 hours' work with athletic teams in approved settings.

The program is approved by the National Athletic Trainers Association. Students who graduate from the athletic training program are eligible to sit for the National Athletic Trainers Association Certification Examination. Upon passing the examination, an individual may apply for Massachusetts licensure as an athletic trainer.

Bachelor of Science Curriculum

Quarter 1	BIO 1152, Integrated Human Anatomy and Physiology 1; CHM 1111, General Chemistry 1; ENG 1110, Freshman English 1; and MTH 1106, Fundamentals of Mathematics.
Quarter 2	ATP 1000, Introduction to Athletic Training; BIO 1153, Integrated Human Anatomy and Physiology 2; CHM 1112, General Chemistry 2; and ENG 1111, Freshman English 2.
Quarter 3	ATP 1050, Emergency Care of Athletic Injuries; BIO 1154, Integrated Human Anatomy and Physiology 3; COM 1105, Computer Science and Its Applications; and SOC 1100, Introduction to Sociology.
Quarter 4	ATP 1100, Prevention and Care of Athletic Injuries; ATP 1101, Athletic Training Laboratory; PHY 1201, Physics for the Life Sciences 1; PHY 1501, Physics Lab; PSY 1111, Foundations of Psychology 1; and one elective.
Quarter 5	ATP 1200, Clinical Athletic Training; PHY1202, Physics for the Life Sciences 2; PTH 1310, Clinical Gross Anatomy; and one elective.
Quarter 6	ATP 1300, Advanced Athletic Training 1; ATP 1390, Athletic Training Practicum 1; CPS 1611, Kinesiology; CRS 1314, Introduction to Counseling; and Middler-Year Writing Requirement.
Quarter 7	ATP 1350, Advanced Athletic Training 2; ATP 1360, Applied Neuroscience; PSY 1112, Foundations of Psychology 2; and one elective.
Quarter 8	ATP 1400, Therapeutic Modalities; ATP 1490, Athletic Training Practicum 2; CPS 1612, Exercise Physiology; and HSL 1468, Overview of Disabilities.

Quarter 9	ATP 1500, Therapeutic Reconditioning; ATP 1590, Athletic Training 3; MTH 1150, Probability, Statistics and the Computer; HSL 1286, Nutrition; and one elective.
Quarter 10	ATP 1600, Organization and Administration of Athletic Training; ATP 1690, Athletic Training Practicum 4; CPS 1408, Research Design; SOC 1195, Drugs in Society.
Quarter 11	ATP 1800, Senior Seminar; one health elective; and two general electives.

Cardiopulmonary Sciences

Mary E. Watson, EdD, RRT, *Associate Professor and Chair*

Associate Professors

Thomas A. Barnes, EdD, RRT
Marilyn A. Cairns, ScD
William J. Gillespie, EdD
Patrick F. Plunkett, EdD, RRT

Assistant Clinical Specialists

Joseph A. Curro, MBA, RRT
Eric B. Pepin, EdD
Annemarie Sullivan, MS

The Bachelor of Science degree program in the Department of Cardiopulmonary Sciences offers a common core curriculum in arts and sciences and cardiopulmonary sciences, as well as an opportunity to concentrate in cardiovascular technology, exercise physiology, or respiratory therapy.

Seminar courses in the first and second year are designed to give students information about professional options within the field of cardiopulmonary sciences so that they may make informed decisions about their specialization.

Cardiovascular Technology

The program in cardiovascular technology helps prepare students to assist cardiologists in performing diagnostic and interventional cardiac catheterizations, cardiac electrophysiology studies, pacemaker implantations, research protocols, and noninvasive testing such as echocardiography and nuclear imaging.

Before these procedures, the cardiovascular technologist prepares the instrument table, the procedure site, and the patient for the physician while maintaining sterile techniques at all times; attaches instruments for obtaining hemodynamic measurements throughout the procedure; and supplies all desired catheters, wires, sheaths, balloons, and devices needed by the physician.

During the procedures, the cardiovascular technologist is usually responsible for operating monitoring equipment and obtaining vital measurements from the patient, performing calculations from data, and informing physicians of any abnormal measurements or any changes in pressures or electrocardiograms. The cardiovascular technologist must be able to adapt preparations and procedures to meet the requirements of the individual case while maintaining the flexibility to deal with different situations.

All students in the cardiovascular technology specialization study fundamentals of cardiovascular technology, advanced cardiovascular technology, imaging modalities, echocardiography, clinical seminars, and clinical practice courses.

Most cardiovascular technologists work in hospitals as part of the health-care team. Others pursue biomedical research positions in companies or health-care facilities. Graduates are eligible for the registry examination for cardiovascular technology given by the National Society for Cardiopulmonary Technology. Upon successful completion of the exam, an individual is designated a Registered Cardiovascular Technologist (RCVT).

Exercise Physiology

An exercise physiologist develops, implements, and coordinates exercise programs and administers exercise tests, usually under the supervision of a physician. A clinical exercise physiologist assesses the patient's status, prescribes appropriate exercise, and counsels and educates patients with cardiovascular, pulmonary, and/or metabolic diseases.

All students in the exercise physiology specialization take courses in exercise physiology, exercise testing, prescription and programming, clinical kinesiology, cardiopulmonary assessment, electrocardiography, organization and administration of rehabilitation programs, and practicum experiences in exercise physiology. Students may then choose an emphasis in either experimental exercise physiology or noninvasive cardiovascular technology. Students concentrating in experimental exercise physiology take courses in organic chemistry and biochemistry, physics, and calculus. Students who focus on noninvasive cardiovascular technology take courses in echocardiography and imaging modalities and complete a cardiovascular technology practicum.

Exercise physiology is an emerging and expanding profession within the health services industry. Exercise physiologists are employed in hospitals and outpatient clinics or in corporate and commercial centers in health promotion, wellness, fitness, and rehabilitation programs.

The American College of Sports Medicine has developed certification programs for professionals in the clinical areas of cardiovascular and pulmonary rehabilitation and in the health and fitness field. Graduates from the exercise physiology program are eligible to sit for either the exercise specialist or exercise test technologist certifications in the clinical area or the health fitness instructor certification in the health and fitness field.

Respiratory Therapy

Respiratory therapists are instrumental in the diagnosis, treatment, management, and preventive care of patients with cardiopulmonary problems. Patients suffering from a variety of acute or chronic disabling conditions may be found in newborn nurseries, surgical and medical units, emergency rooms, outpatient departments, and intensive care units.

Respiratory therapists are involved in treating disorders such as cardiac failure, asthma, pulmonary edema, emphysema, cerebral thrombosis, drowning, hemorrhage, and shock. The respiratory therapist is a life-support specialist trained in airway management, artificial ventilation, external cardiac massage, and other sophisticated emergency support measures.

Working under physicians' orders, respiratory therapists carry out specific therapeutic measures. They must provide and recommend specialized care and be skilled in such areas as medical gas administration; humidification, aerosols, and intermittent positive pressure breathing (IPPB); chest physiotherapy; cardiopulmonary resuscitation; mechanical ventilation; airway management; pulmonary function studies; blood gas analysis; and physiologic monitoring.

All students in the respiratory therapy specialization take several respiratory therapy didactic, laboratory, seminar and clinical practice courses.

After successful completion of the program, students are eligible to take the respiratory therapy registry examination administered by the National Board for Respiratory Care. Those who pass the exam earn the recognition Registered Respiratory Therapist (RRT). The program is accredited by the Commission on Accreditation of Allied Health Education Programs.

**Bachelor of Science in
Cardiopulmonary Science
Curriculum**

Quarter 1	CHM 1105, General Chemistry I; COM 1105, Computer Science and Its Applications; CPS 1111, Cardiopulmonary Sciences Seminar 1; ENG 1110, Freshman English 1; and PSY 1111, Foundations of Psychology.
Quarter 2	BIO 1140, Animal Biology 1; CHM 1106, General Chemistry 2; CPS 1112, Cardiopulmonary Sciences Seminar 2; NUR 1282, Wellness; and SOC 1100, Introduction to Sociology.
Quarter 3	BIO 1120, Microbiology; CPS 1114, Basic Life Support; ENG 1111, Freshman English 2; MTH 1107, Functions and Basic Calculus; and one arts and sciences elective.
Quarter 4	PAH 1202, Anatomy & Physiology 1; PHY 1201, Physics for the Life Sciences 1; PHY 1501, Physics Lab; one humanities elective; and one open elective.
Quarter 5	CPS 1113, Cardiopulmonary Sciences Seminar 3; MTH 1150, Probability, Statistics, and the Computer; PAH 1204, Anatomy & Physiology 2; PHL 1165, Moral Problems in Medicine; and one humanities elective.

**Cardiovascular
Technology Curriculum**

Additional Courses: Cardiopulmonary Physiology; Pathophysiology; Physics for the Life Sciences 3; Nutrition; Cardiopulmonary Disease; Writing for the Health Professions; Exercise Physiology 1; Research Design; Health Science Education; Pharmacology; Electrocardiography; Cardiopulmonary Assessment; Fundamentals of Cardiovascular Technology; Clinical Seminars; Advanced Cardiovascular Technology; Cardiovascular Technology Practicum 1 and 2; Imaging Modalities; Echocardiography; Advanced Cardiac Life Support; and arts and sciences electives.

**Exercise Physiology
Curriculum**

Additional Courses: Cardiopulmonary Physiology; Clinical Kinesiology; Pathophysiology; Physics for the Life Sciences 3; Nutrition; Cardiopulmonary Disease; Writing for the Health Professions; Exercise Prescription and Program; Exercise Physiology 1 and 2; Research Design; Health Science Education; Cardiopulmonary Assessment; Electrocardiography; Pharmacology; Clinical Practicum 1 and 2; Clinical Seminar; Administrative Rehabilitation Programs; Advanced Cardiac Life Support; and electives.

**Respiratory Therapy
Curriculum**

Additional Courses: Cardiopulmonary Physiology; Pathophysiology; Physics for the Life Sciences 3; Nutrition; Cardiopulmonary Disease; Writing for the Health Professions; Exercise Physiology 1; Research Design; Health Science Education; Introduction to Respiratory Care; Professional Practice Laboratories; Clinical Seminars; Pharmacology; Cardiopulmonary Assessment; Electrocardiography; Practicum in Respiratory Care 1, 2 and 3; Respiratory Care for the Medical and Surgical Patient; Respiratory Care for Critical Patients; Neonatal and Pediatric Respiratory Care; Advanced Cardiac Life Support; and electives.

Dental Hygiene

Linda Hanlon, RDH, BS, MEd, *Dean*
Judith S. Harvey, CDA, BA, MEd, *Director of Admissions*
Kristen D. Hoag, BS, BA, MEd, *Assistant to the Dean*

The Forsyth School of Dental Hygiene conducts a program of dental hygiene education in cooperation with Northeastern University. Students attend classes at both the Forsyth Dental Center and Northeastern. The dental hygienist is the "preventive oral health professional licensed in dental hygiene, who provides educational, clinical, and therapeutic services supporting total health

through the promotion of optimal oral health." In other words, the dental hygienist is that member of the oral health team who is responsible for the preventive aspects of dental treatment.

Graduates receive the Certificate in Dental Hygiene from the Forsyth School and the Associate in Science or Bachelor of Science in dental hygiene from Northeastern University. Graduates must satisfy the state dental hygiene licensure requirements before they may practice.

These programs are accredited by the Commission on Dental Accreditation of the American Dental Association, an accrediting body approved by the United States Department of Education.

Application should be made directly to the Forsyth School of Dental Hygiene, Office of Admissions, 140 The Fenway, Boston, MA 02115. For an application and a copy of the college catalogue, write that office or call 617-262-5200, extension 211, 212, or 213, FAX 617-262-4021.

Bachelor of Science Curriculum

Quarter 1	BIO 1115, Introduction to Human Biology; DHY 1204, Head and Neck Anatomy; ENG 1110, Freshman English 1; MTH 1106, Functions and Algebra; and PSY 1111, Foundations of Psychology 1.
Quarter 2	CHM 1105, Chemistry for Health Science 1; DHY 1101, Dental Hygiene Orientation 1; ENG 1111, Freshman English 2; and SOC 1100, Introduction to Sociology.
Quarter 3	BIO 1120, Basic Microbiology; CHM 1106, Chemistry for Health Science 2; DHY 1102, Dental Hygiene Orientation 2; and one Northeastern University elective.
Quarter 4	BIO 1150, Human Anatomy and Physiology; DHY 1100, Oral Anatomy & Histology; DHY 1211, Dental Hygiene Theory 1; DHY 1220, Radiology 1; and DHY 1611, Clinical Dental Hygiene 1.
Quarter 5	BIO 1151, Human Anatomy and Physiology 2; DHY 1209, Periodontology; DHY 1212, Dental Hygiene Theory 2; DHY 1221, Radiology 2; and DHY 1612, Clinical Dental Hygiene 2.
Quarter 6	DHY 1240, Nutrition; DHY 1214, Dental Hygiene Theory 3; DHY 1228, Dental Materials; DHY 1613, Clinical Dental Hygiene 3; PHP 1303, Interpersonal Skills for Health Professionals; and one Northeastern University elective (optional).
Quarter 7	DHY 1308, Pathology; DHY 1317, Dental Hygiene Theory 4; DHY 1330, Pharmacology; DHY 1614, Clinical Dental Hygiene 4; and MTH 1152, Statistical Thinking.
Quarter 8	DHY 1315, Dental Hygiene Theory 5; DHY 1331, Pain Control; DHY 1361, Public Health; DHY 1615, Clinical Dental Hygiene 5; and one Northeastern University elective.
Quarter 9	DHY 1316, Dental Hygiene Theory 6; DHY 1362, Community Health; DHY 1364, Law and Ethics; DHY 1616, Clinical Dental Hygiene 6; and one Northeastern University elective.
Quarter 10	DHY 1301, Introduction to Oral Health Research; DHY 1401, Oral Health Gerontology; ENG 1125, Technical Writing 1; and one Northeastern University elective.
Quarter 11	DHY 1402, Advanced Public Health; PAH 1135, Professional Dynamics in the Health Care Delivery System; and two Northeastern University electives.
Quarter 12	DHY 1403, Dental Seminars; DHY 1410, Independent Study; and DHY 1550, Internship.

Associate in Science Curriculum

Quarter 1	BIO 1150, Human Anatomy and Physiology 1; DHY 1100, Oral Anatomy and Histology; DHY 1204, Head and Neck Anatomy; DHY 1211, Dental Hygiene Theory 1; DHY 1220, Radiology 1; and DHY 1611, Clinical Dental Hygiene 1.
Quarter 2	BIO 1151, Human Anatomy and Physiology 2; DHY 1209, Periodontology; DHY 1212, Dental Hygiene Theory 2; DHY 1221, Radiology 2; and DHY 1612, Clinical Dental Hygiene 2.
Quarter 3	BIO 1120, Basic Microbiology; DHY 1240, Nutrition; DHY 1214, Dental Hygiene Theory 3; DHY 1228, Dental Materials; and DHY 1613, Clinical Dental Hygiene 3.
Quarter 4	DHY 1308, Pathology; DHY 1317, Dental Hygiene Theory 4; DHY 1330, Pharmacology; DHY 1614, Clinical Dental Hygiene 4; and ENG 1110, Freshman English 1.
Quarter 5	DHY 1315, Dental Hygiene Theory 5; DHY 1331, Pain Control; DHY 1361, Public Health; DHY 1615, Clinical Dental Hygiene 5; and PSY 1111, Foundations of Psychology 1.
Quarter 6	DHY 1316, Dental Hygiene Theory 6; DHY 1362, Community Health; DHY 1364, Law and Ethics; DHY 1616, Clinical Dental Hygiene 6; ENG 1111, Freshman English 2; and SOC 1100, Introduction to Sociology.

Health Information Administration

The Health Information Administration Program, formerly offered through the full-time day undergraduate college, will be offered through our evening division, University College. The program will be offered as an accelerated or part-time program. For further information, call 617-373-2818.

Medical Laboratory Science

Barbara E. Martin, MHP, MT(ASCP), CLS(NCA), *Director and Senior Clinical Specialist*

Professor

James J. Gozzo, PhD

Associate Professors

Judith T. Barr, ScD, CLS(NCA)

Britta L. Karlsson, MS,
MT(ASCP), CLS(NCA)

Edward W. Schroder, PhD,
M(ASCP)

Lecturers

Timothy Foley, MS, MT(ASCP)

Walid Khouri, MS, MT(ASCP)

Frances Sullivan, BA, MT(ASCP)

Elizabeth Szymczak, MS,
MT(ASCP)

Laboratory Coordinator

Judith Baronas, BS, MT(ASCP)

The Department of Medical Laboratory Science prepares professionals in the laboratory disciplines of clinical chemistry, hematology, immunohematology, immunology, and microbiology. Medical laboratory scientists (medical technologists) perform diagnostic test procedures using state-of-the-art computerized analyzers. They are responsible for overseeing patient specimen collection, and for test accuracy, cost-effectiveness, and efficiency in reporting results to physicians. Physicians rely on laboratory tests to establish a diagnosis and to determine therapy. Traditionally the program has prepared students for positions in health-care delivery, but, through cooperative education experiences, it also offers students the opportunity to explore positions in biological research, the biotechnology industry, and governmental agencies. Many graduates enter responsible positions in these areas. The curriculum also provides excellent preparation for advanced studies in graduate and professional schools.

The five-year program leads to a Bachelor of Science degree. Students begin the experiential learning phase of the program during their sophomore year, with cooperative education placements in regional institutions. Upper class students have the opportunity for international placements. Recently students have had co-ops in Sweden and the United Kingdom. In their junior and senior years students receive formal clinical training at some of metropolitan Boston's finest health-care facilities. To enter clinical training students must complete all prerequisite courses and maintain an acceptable quality-point average. Graduates of the Bachelor of Science program are eligible for national certification examinations as medical technologists and clinical laboratory scientists. Some states require additional licensure examinations.

The department also offers a three-year Associate in Science program that culminates in eligibility for national certification examinations at the level of medical or clinical laboratory technician. Students may use this option to enter the medical laboratory profession. Qualified students may apply associate degree coursework toward subsequent studies for the baccalaureate degree.

Bachelor of Science Curriculum

Quarter 1	BIO 1106, General Biology; CHM 1111, General Chemistry 1; ENG 1110, Freshman English 1; MLS 1101, MLS Orientation 1; and MTH 1106, Fundamentals of Mathematics or MTH 1107, Functions and Basic Calculus.
Quarter 2	BIO 1107, Animal Biology; MLS 1102, MLS Orientation 2; PAH 1135, Professional Dynamics in Health Care Delivery; PHY 1201, Physics 1; PHY 1501, Physics 1 Laboratory (optional); and one elective.
Quarter 3	CHM 1122, General Chemistry 2; ENG 1111, Freshman English 2; MLS 1104, Laboratory Techniques; PHY 1202, Physics 2; and PHY 1502, Physics 2 Laboratory.
Quarter 4	CHM 1264, Organic Chemistry 1; MLS 1112, Renal Physiology and Urinalysis; MLS 1212, Urinalysis Laboratory; PAH 1210, Anatomy and Physiology; and one elective.
Quarter 5	CHM 1265, Organic Chemistry 2; MLS 1172, Basic Immunology; PAH 1212, Anatomy and Physiology; and one or two electives.
Quarter 6	BIO 1260, Genetics and Developmental Biology; CHM 1221, Analytical Chemistry; MLS 1145, Microbiology; MLS 1245, Microbiology Laboratory; and one elective.
Quarter 7	BIO 1261, Cell Physiology and Biochemistry; ENG 1380, Writing for the Health Professions; MLS 1648, Advanced Microbiology; MLS 1649, Parasitology and Mycology; and one elective (optional).

Quarter 8	MLS 1125, Hematology; MLS 1132, Immunohematology; MLS 1152, Clinical Chemistry; MLS 1225, Hematology Laboratory; MLS 1252, Clinical Chemistry Laboratory; MLS 1661, MLS Education; and one elective (optional).
Quarter 9	MLS 1232, Immunohematology Laboratory; MLS 1621, Advanced Hematology; MLS 1623, Special Topics in Hemostasis; MLS 1631, Advanced Immunohematology; MLS 1656, Advanced Clinical Chemistry; one elective; and one elective (optional).
Quarter 10	MLS 1523, Hematology MT Applied Study; MLS 1544, Clinical Microbiology MT Applied Study; MLS 1573, Immunology 1 MT Applied Study 2; and MLS 1665, Management.
Quarter 11	MLS 1533, Immunohematology MT Applied Study; MLS 1552, MT Clinical Chemistry Applied Study; MLS 1574, Immunology 2 MT Applied Study, Senior Seminar.

Minor Curriculum

This minor provides students majoring in other science fields an opportunity to explore the principles of the biological and chemical sciences as applied in the medical laboratory. Students may specialize in one of the five categorical areas of Medical Laboratory Science: clinical chemistry, hematology, immunology, immunohematology, or microbiology. Four to five MLS courses are required for each minor. Upon completing the categorical minor and a baccalaureate degree, the student may be eligible for categorical national certification examination based on relevant work experience or completion of clinical applied studies. Interested students must contact the MLS minor adviser in 206 Mugar to select appropriate courses. Prerequisites: General Chemistry 1 and General Biology for all except students specializing in clinical chemistry.

Pharmacy

Department of Pharmaceutical Sciences

Robert N. Hanson, PhD, *Professor and Chair*

Professors

Mehdi Boroujerdi, PhD
Richard C. Deth, PhD
Roger W. Giese, PhD
James J. Gozzo, PhD
Ban An Khaw, PhD

Associate Professors

Norman R. Boisse, PhD
Ralph H. Loring, PhD
Robert A. Schatz, PhD
Edward W. Schroder, PhD
Barbara L. Waszczak, PhD

Assistant Professors

Mansoor Amiji, PhD
Jonathan Freedman, PhD
Eric J. Mack, PhD

Lecturer

Eugene A. Bernstein, PhD

Department of Pharmacy Practice

William E. Smith, PharmD, MPH, PhD, *Associate Professor and Chair*

Professor

Gerald E. Schumacher,
PharmD, PhD

Associate Professors

Judith T. Barr, ScD
Robert J. Cersosimo, PharmD
Louise G. Cohen, PharmD
Samuel J. Matthews, PharmD

Assistant Professors

Eric M. Hillson, PhD
Kristin C. Oberg, PharmD
Raafat A. Seifeldin,
PharmD, PhD
Shirley M. Tsunoda, PharmD

Assistant Clinical Specialist

Todd A. Brown, BS

Pharmacists promote the safe use of drugs by providing pharmacy care. The expanding role of the pharmacist as a clinical drug consultant to physicians, nurses, health care professionals, and patients has broadened the scope of professional opportunities. Pharmacists prepare and dispense the drugs prescribed by physicians. The roles of clinical drug expert and drug dispensing have given practitioners greater involvement as part of the health-care team.

Pharmacy also offers careers in management research, manufacturing, government, law enforcement, and education. Many graduates of the pharmacy program go on to leading graduate schools.

The college offers a five-year curriculum leading to the Bachelor of Science in pharmacy degree. The curriculum offers a blend of academic classroom and cooperative education experiences. The undergraduate pharmacy program subscribes to the standards established by the American Council on Pharmaceutical Education and the American Association of Colleges of Pharmacy.

Candidates for the Bachelor of Science in pharmacy degree must complete all prescribed courses—a minimum of 227 quarter hours. Students must maintain an overall quality-point average (QPA) of C (2.0) and a C average in required pharmacy courses. They must meet the requirements of the Department of Cooperative Education to be eligible for the degree.

Pharmacists must meet certain requirements to obtain a license from the state in which they want to practice. These requirements ordinarily include graduating from an accredited college of pharmacy, passing an examination given by a state board of pharmacy, and completing an internship.

The internship is a period of supervised practical experience in a preceptor pharmacy. This requirement is generally satisfied during the cooperative education periods, which commence during the student's second academic year. Students may apply up to 400 hours of the required academic clinical clerkship experience to their internship requirements. In addition, a college-directed externship adds to the total practice-oriented portion of the curriculum.

The profession of pharmacy requires a significant amount of patient contact. Counseling by the pharmacist is considered essential to the effective and safe use of medications. Community pharmacy offers the opportunity to combine specialized pharmaceutical training with skills in management, business administration, and marketing. In addition to the patient contact and counseling, community pharmacists also spend considerable time discussing health-related matters with the prescribing physicians. Hospital and clinical pharmacists have the opportunity to apply clinical skills on a day-to-day basis; they may accompany other health-care professionals on ward rounds and consult with physicians on individual therapeutic regimens. Opportunities are expanding for pharmacists elsewhere. Health maintenance organizations (HMOs) and private groups, nursing homes and retirement complexes, the Public Health Service, health facilities, health systems, the armed services, and law enforcement agencies such as the Federal Drug Enforcement Administration all require pharmacists. Other graduates find employment in drug production or marketing with pharmaceutical companies, colleges of pharmacy, or in journalism. A growing number of pharmacy graduates seek additional professional training in pharmaceutical sciences, management, or law.

Bachelor of Science Curriculum

Quarter 1	BIO 1106, General Biology; CHM 1111, General Chemistry I; MTH 1106, Fundamentals of Mathematics <i>or</i> MTH 1107, Functions and Basic Calculus; PHP 1102, The Profession of Pharmacy; and one arts and sciences elective.
Quarter 2	BIO 1107, Animal Biology; ENG 1110, Freshman English I; MTH 1107, Functions and Basic Calculus <i>or</i> MTH 1108, Calculus; and PAH 1135, Professional Dynamics in Health Care Delivery.
Quarter 3	CHM 1122, General Chemistry 2B; ENG 1111, Freshman English 2; MTH 1108, Calculus <i>or</i> an open elective; and one arts and sciences elective.
Quarter 4 (Entire class) (Sept.–Dec.)	CHM 1268, Organic Chemistry I; PCT 1240, Pharmaceutical Calculations <i>or</i> PAH 1202, Anatomy and Physiology I; PHY 1201, Physics I; and one arts and sciences elective.
Quarter 4A (Entire class) (Jan.–March)	CHM 1269, Organic Chemistry 2; PAH 1202, Anatomy and Physiology I <i>or</i> PCT 1240, Pharmaceutical Calculations; PHY 1203, Physics 3; and one arts and sciences elective.
Quarter 5 (April–June and June–Sept.)	COM 1105, Computer Science and Its Applications; ENG 1340, Writing Workshop; PAH 1204, Anatomy and Physiology 2; PAH 1280, Biochemistry; and PHP 1303, Interpersonal Skills for Health Professionals.
Quarter 6	PCT 1300, Dosage Forms; PCT 1320, Dosage Forms Laboratory; PHP 1411, Pathophysiology; PMC 1322, Pharmaceutical Biotechnology; and PMC 1419, Pharmacology/Medicinal Chemistry 1.
Quarter 7	BIO 1121, Microbiology; PCL 1420, Pharmacology/Medicinal Chemistry 2; PCL 1451, Pharmacology Lab; PCT 1340, Physical Pharmacy; and PCT 1360, Physical Pharmacy Laboratory.
Quarter 8	PCL 1422, Pharmacology/Medicinal Chemistry 3; PCT 1440, Biopharmaceutics/Pharmacokinetics; PHP 1301, Pharmaceutical Jurisprudence; and PMC 1421, Antiinfectives.
Quarter 9 (Entire Class) (April–June)	PHP 1401, Drug Information and Evaluation; PHP 1441, Therapeutic Drug Monitoring; PHP 1601, Nonprescription Medication; and PHP 1609, Pharmacotherapeutics.
Quarter 10 (Summer/ Winter)	PHP 1314, Pharmacy Care Management; PHP 1402, Parapharmaceuticals; PHP 1503, Professional Practice Lab; one professional elective; and one arts and sciences elective.
Quarter 10A (Fall/Spring)	PHP 1302, Pharmacy Administration I; TOX 1300, Clinical Toxicology; one professional elective; and one arts and sciences elective.
Quarter 11	PHP 1501, Community Pharmacy Externship.
Quarter 12	PHP 1505, Hospital Externship and PHP 1506, Clinical Clerkship.

Entry-Level PharmD

The College offers a Doctor of Pharmacy (PharmD) entry-level tracking curriculum. This program is offered to a limited number of Northeastern University pharmacy students. Students entering the Pharmacy Program will have the opportunity to track into the entry-level PharmD program in their junior year, contingent upon their maintaining a QPA of 2.75 or better.

Physical Therapy

Meredith H. Harris, EdD, *Associate Professor and Acting Chair*
Ann Noonan, EdD, PT, *Acting Program Director*

Associate Professors

Janice S. Bruckner, PhD
Robert Sikes, PhD
Chad A. Starkey, PhD,
Program Director,
Athletic Training

Assistant Professor

Shirley Stockmeyer, MA

Associate Clinical Specialist

Cindy I. Buchanan, MS

Assistant Clinical Specialists

Joseph Cigna, PhD, PT
Xristos Gaglias, MS, AT
Ann Golub, MS, PT
Kimberly Klien, NCS, MS, PT
Sonya L. Larrieux, MA
Mary O'Brien, MPH
Donnalee Shain, MS, PT
Nancy H. Sharby, MS
Margaret Stacey, MS, AT

The physical therapy program prepares its graduates to provide quality patient care in a time of changing concepts, trends, and challenges. Students learn to help clients gain functional independence and to recognize and manage the emotional and socioeconomic problems that affect recovery.

Physical therapists evaluate the condition of the patient, plan and execute treatment programs developed to meet the patient's treatment goals, and periodically reassess those treatment goals. In addition, they develop injury-prevention and health-promotion activities and are trained to integrate their treatment plans into the total care plan for the patient. Additional responsibilities may include health-care planning and community service.

Physical therapists are employed in community and university hospitals; rehabilitation centers; private practices; educational or other pediatric settings; extended care facilities; freestanding outpatient clinics; home health agencies; and community, state, and federal agencies. They are also involved in research and teaching.

Northeastern's physical therapy program is one of the few programs that accepts students directly into the freshman class. Students are physical therapy majors on their first day of classes, and there are no additional admission steps at any point. To continue in the program, students must maintain acceptable standards of scholarship and academic performance (as outlined in the student handbook) and must develop appropriate motor skills, professional behavior, and emotional maturity.

The department's Master of Science program stresses clinical problem solving. In the classroom students develop problem-solving skills, manual dexterity, and proficiency in technique and equipment. Cooperative education experiences give students a chance to apply knowledge gained in the classroom to clinical practice and to become members of the health-care community early in their studies.

In addition to cooperative education, the program includes periods of clinical experience, called affiliations, during which the student performs all duties of the physical therapist under the supervision of a licensed physical therapist.

Cooperative education placements and affiliations are available in a wide range of specialties and are located at sites throughout the country.

The curriculum in physical therapy is accredited by the Commission on Accreditation in Physical Therapy Education of the American Physical Therapy Association.

Graduates of the program are eligible to sit for the Physical Therapy Licensure Examination.

Bachelor of Science in Rehabilitation Science Curriculum

Quarter 1	BIO 1152, Integrated Human Anatomy and Physiology 1; CHM 1105, Chemistry for Health Sciences 1; MTH 1106, Functions and Algebra or MTH 1107, Functions and Basic Calculus.
Quarter 2	BIO 1153, Integrated Human Anatomy and Physiology 2; CHM 1106, Chemistry for Health Sciences 2; and ENG 1110, Freshman English 1.
Quarter 3	BIO 1154, Integrated Human Anatomy and Physiology 3; MTH 1150, Probability, Statistics and the Computer; and ENG 1111, Freshman English 2.
Quarter 1, 2, or 3	COM 1105, Computer Science and Its Applications; PTH 1114, Introduction to Physical Therapy; PTH 1007, Cooperative Education in Physical Therapy (quarter 1 or 2 only); and designated electives.*

*Designated electives: Students must take 1 course in 3 of the following areas: sociology/anthropology, psychology, fine arts, or history/political science.

	Quarter 4	PTH 1252, Clinical Gross Anatomy 1; PHY 1201, Physics for the Life Sciences 1; PHY 1501, Physics for the Life Sciences 1 Lab; designated electives*; and PTH 1114, Introduction to Physical Therapy (transfer students only).
	Quarter 5	PTH 1253, Clinical Gross Anatomy 2; PHY 1202, Physics for the Life Sciences 2; PTH 1202, Therapeutic Modalities in Physical Therapy Practice; and CPS 1612, Exercise Physiology.
	Quarter 4 or 5	Designated electives.*
Additional Professional and Required Courses		Basic Physical Therapy Procedures; Neuromuscular Physiology; Soft Tissue Mobilization; Clinical Medicine 1; Developmental Basis of Human Performance; Applied Neuromuscular Physiology; Investigative Studies; Introduction to Counseling/Communication; Writing Workshop; Psychosocial Aspects of Disability; Basic Pathology and Diagnostic Work; Evaluative Procedures; Clinical Integration; Clinical Therapeutics for Physical Therapy; Musculoskeletal Pathology; Pathokinesiology; Musculoskeletal Evaluation and Treatment; Principles of Prosthetics; Clinical Neuroscience; Fundamental Neuroanatomy; Cardiopulmonary Evaluation and Treatment; Cardiopulmonary Disability; Neurologic Evaluation; Neurologic Therapeutic Exercise; Clinical Education Preparation; Open electives; Professional electives.
Graduate Year		<p>Concepts of Pediatric Management; Seminar in Life Span Issues; Research on Life Span Issues in Physical Therapy; Functional Aspects of Aging; Health Research Methods; Issues in Medical Ethics; Advanced Processes in Clinical Concentration Area; Physical Therapy Project 1 and 2; Health Care Delivery; Clinical Management in Leadership; elective in professional specialty concentration and other electives.</p> <p>This curriculum was approved by the Northeastern University Trustees in June 1995 as a component of the total Master of Science proposal. Individual courses are subject to revision pending program curriculum changes.</p> <p>At the end of quarter 11, students will be granted a Bachelor of Science in Rehabilitative Science. This degree will <i>not</i> allow graduates to sit for the physical therapy licensing examination.</p> <p>At the end of the sixth or graduate year, students will be awarded the Master of Science in Physical Therapy (MSPT). Students with the MSPT degree are eligible to sit for the licensing examination for physical therapy.</p> <p>The program in physical therapy is accredited by the Commission on Accreditation in Physical Therapy Education of the American Physical Therapy Association.</p> <p>*Designated electives: Students must take 1 course in 3 of the following areas: sociology/anthropology, psychology, fine arts, or history/political science.</p>

Speech-Language Pathology and Audiology

Kevin P. Kearns, PhD, *Associate Professor and Chair*

Professors

Arlene Greenstein, PhD
Mary Florentine, PhD

Associate Professors

Linda Ferrier, PhD
Robert Redden, EdD

Assistant Professor

Gregory Loff, PhD

Clinical Specialists

Helen Anis, MA
Kelly Robinson, MA
Mary Beth Lannon, EdD
Marjorie North, MA

Research Faculty

Christine Rankovic, PhD
Deborah Ingenito, MS

Speech-language pathologists and audiologists are involved with the evaluation and treatment of, and counseling and research in, human communication and its disorders. The speech-language pathology and audiology program is designed to help students develop entry-level competencies that will enable them to function in a preprofessional capacity in educational settings, medical and rehabilitation centers, and private practice clinics. Students will be exposed to a wide variety of communication disorders through observations and participation in activities at the Northeastern University Speech and Hearing Center. Externship in schools, hospitals, or other relevant settings will also broaden students' exposure and prepare them for graduate study or employment.

Speech-language pathologists and audiologists provide clinical services to a full range of communicatively impaired individuals from infants through geriatrics. Speech-language pathologists treat disorders such as developmental language and articulation disorders, voice and resonance problems, stuttering, and language and cognitive impairments due to stroke, head injury, and progressive neurologic diseases. Audiologists specialize in the prevention, identification, assessment and rehabilitation of hearing disorders. Both congenital and acquired hearing impairments are seen for services by audiologists. They prescribe and dispense hearing aids and instruct individuals in the use of amplification. Undergraduate students take courses in both speech-language pathology and audiology in preparation for advanced training and specialization at the graduate level.

The bachelor of science degree program in speech-language pathology and audiology includes an experiential learning component, a broad-based academic core, and the scientific and clinical coursework necessary for understanding normal and disordered communication. The degree offers preprofessional training for individuals who want to pursue graduate education in speech-language pathology and audiology. Alternately, graduates may be hired as speech and hearing assistants in a variety of clinical settings, or they may pursue other career paths in health care and education.

The speech-language pathology and audiology curriculum is designed to facilitate critical thinking, information literacy, and oral and written communication skills. In addition to coursework in the basic communication sciences, coursework is required in special needs/education, allied health, computer literacy, ethics, multicultural/diversity issues, and psychology. The curriculum provides a solid foundation in speech-language pathology and audiology and arts and sciences, and it is sufficiently flexible to provide students with the opportunity to minor in a related interest area.

A unique aspect of the program is an accelerated graduate provision for students who qualify at the end of year three. Students who have maintained a QPA of 3.25 or better, who have a departmental endorsement, and who have satisfied all graduate program admissions requirements may seek admission to Northeastern University's graduate program in speech-language pathology and audiology. In effect, students who enter the accelerated master's degree track will complete the bachelor of science requirements within the framework of our graduate program. They will be eligible for the master of science and bachelor of science degrees and meet national certification requirements at the end of their fifth year of matriculation. The accelerated track will be selective and restricted in number. The graduate programs in speech-language pathology and audiology and the University's Speech and Hearing Center are fully accredited by the American Speech-Language-Hearing Association.

Class Entrance Requirements

Students in speech-language pathology and audiology are required to obtain a grade of C or better in professional courses. A required course in which a grade below C or a grade of W is received can be repeated only once.

Special Requirements

During the first two years, speech-language pathology and audiology students must achieve a grade of C or better in each of the prerequisite sciences, as well as in each professional course; all deficiencies, if any, must be cleared before a student may progress into the middler year. Beginning with quarter 6, students must achieve a grade of C or better in each professional course to progress to the next academic quarter. In addition, specific academic requirements govern performance in the speech-language pathology and audiology program and department.

Quarter 1	BIO 1150, Human Anatomy and Physiology 1; ENG 1110, Freshman English 1; MTH 1106, Functions and Algebra <i>or</i> MTH 1107, Functions and Basic Calculus; and SLA 1101, Introduction to Speech and Hearing.
Quarter 2	BIO 1151, Human Anatomy and Physiology 2; COM 1105, Computer Science and Its Applications; ENG 1111, Freshman English 2; and PSY 1111, Foundations of Psychology 1.
Quarter 3	MTH 1150, Probability, Statistics and the Computer; PSY 1112, Foundations of Psychology 2; SLA 1201, Anatomy and Physiology Vocal Mechanism; and one nursing or Bouvé/allied health elective.
Quarter 4	PSY 1231, Learning and Motivation 1; SLA 1300, Language Acquisition; SLA 1301, Phonetics; and one elective.
Quarter 5	PHL 1165, Moral Problems in Medicine <i>or</i> ethics elective; SOC 1160, Gender in a Changing Society <i>or</i> multicultural/diversity elective, and Speech Pathology 1.
Quarter 6	CMN 1330, Interpersonal Communication 1 <i>or</i> communication elective; SLA 1200, Hearing Science; SLA 1400, Speech Science; and one open elective.
Quarter 7	ENG 1380, Writing for the Health Professions; PSY 1262, Psychology of Language <i>or</i> a psychology elective; SLA 1303, Introduction to Audiology; and SLA 1460, Neurological Bases of Communication <i>or</i> an elective.
Quarter 8	SOC 1217, Women, Health and Social Change <i>or</i> diversity/multicultural elective; Speech Pathology 2; and one open elective.
Quarter 9	PSY 1364, Cognition <i>or</i> psychology elective; SLA 1403, Clinical Procedures, Speech; Clinical Procedures, Audiology <i>or</i> elective; and one SLA elective.
Quarter 10	ED 1311, Case Management: Diagnosis and Treatment <i>or</i> ED/CRS elective; SLA 3629, Aural Rehabilitation; and one open elective.
Quarter 11	Externship in speech-language pathology and audiology.
Quarter 12	Seminar in speech-language pathology and audiology; and open electives.

Toxicology

Robert A. Schatz, PhD, *Associate Professor and Director*

Toxicology examines the adverse effects of chemicals on biologic systems, the conditions under which those effects occur, and the relevant socioeconomic conditions and legal ramifications. The program offers a five-year Bachelor of Science degree that prepares students for work in a variety of specialties.

Forensic toxicology is a hybrid of analytical chemistry and fundamental toxicological principles that focuses on the medical and legal aspects of the harmful effects of chemicals. Biomedical toxicologists are concerned with intoxication by drugs and other chemicals. They are also involved in demonstrating the safety or danger of a drug prior to its release on the market.

Industrial or environmental toxicologists specialize in recognizing, identifying, and quantitating the relative hazards from occupational or public exposure to toxicants. Toxicologists who practice this specialty play a vital role in ensuring the safety of those in the work force or the general public who come into contact with industrial and commercial products.

Numerous federal and local laws aimed at protecting the environment, safeguarding employees in their workplaces, and protecting consumers against hazardous household products have created a critical demand for toxicologists. Job opportunities exist in government, industry, and environmental firms. Many graduates pursue advanced studies.

Bachelor of Science Curriculum

Quarter 1	BIO 1106, General Biology 1; ENG 1110, English 1; MTH 1107, Functions and Basic Calculus; TOX 1100, Toxicology Orientation; and one arts and sciences elective.
Quarter 2	CHM 1111, General Chemistry 1; ENG 1111, Freshman English 2; PHY 1201, Physics 1; and one arts and sciences elective.
Quarter 3	BIO 1107, Animal Biology 2; CHM 1122, Chemistry 2B; MTH 1108, Calculus; and one arts and sciences elective.
Quarter 4	CHM 1264, Organic Chemistry 1; PAH 1202, Anatomy and Physiology 1; PHY 1203, Physics 3; and TOX 1101, Current Topics in Toxicology.
Quarter 5	CHM 1265, Organic Chemistry 2; PAH 1204, Anatomy and Physiology 2; PSY 1211, Statistics in Behavioral Science; and one arts and sciences elective.
Quarter 6	PAH 1280, Biochemistry; PMC 1322, Pharmaceutical Biotechnology; PMC 1419, Medicinal Chemistry/Pharmacology 1; and one arts and sciences elective.
Quarter 7	ENG 1340, Writing Workshop; PCL 1420, Pharmacology/Medicinal Chemistry 2; PCL 1451, Pharmacology Lab; TOX 3121, Environmental Toxicology; and one arts and sciences elective.
Quarter 8	PCL 1422, Pharmacology/Medicinal Chemistry 3; MHP 3200, Risk Assessment; TOX 1301, Fundamental Principles of Systemic Toxicology; and one professional elective.
Quarter 9	BIO 1120, Basic Microbiology; BIO 1261, Cell Physiology and Biochemistry; TOX 1300, Clinical Toxicology; TOX 1813, Toxicology Research or one professional elective.
Quarter 10	CHM 1432, Instrumental Analysis or CHM 1461, Identification of Organic Compounds; TOX 1322, Biochemical Toxicology Laboratory; TOX 1811, Toxicology Research; and one arts and sciences elective.
Quarter 11	MLS 4341, Epidemiology; TOX 1302, Chemical and Analytical Toxicology; TOX 1813, Toxicology Research; and one or two arts and sciences electives.

Post-Baccalaureate Certificate Programs

Medical Laboratory Science

The program in medical laboratory science enables students with a baccalaureate degree and sufficient background in the biological and chemical sciences to become eligible for certification in clinical microbiology, chemistry, hematology, immunohematology, or immunology. Depending upon the specialty, students must complete 18 to 23 quarter hours of professional coursework, which must include applied study at an affiliated clinical site. After completing the program, students may be eligible for the national certification examination in a specialty area. Completion requires 12 to 24 months of part-time study depending on prerequisite coursework, specialty chosen, and the timing of a student's entry into the program.

College of Business Administration

Ira R. Weiss, PhD, *Dean*

Roger M. Atherton, Jr., PhD, *Senior Associate Dean for Academic Affairs*

Jay A. Halfond, PhD, *Associate Dean for Administration*

William I. Kelly, MS, *Director, Graduate School of Professional Accounting*

Coleen C. Pantalone, PhD, *Associate Dean for Undergraduate Programs*

William F. Crittenden, PhD, *Associate Dean for Graduate Programs*

Accounting Group

Professors
Paul A. Janell, PhD,
Joseph M. Golemme
Professor of Accounting
Sharon M. McKinnon, PhD
Ira R. Weiss, PhD

Associate Professors
Jean C. Bedard, PhD
Julie Hertenstein, DBA
Thomas C. Omer, PhD
Marjorie Platt, PhD
H. David Sherman, DBA

Lecturers
Michael D. Cottrill, MAC
Hugh J. Crossland, LLM
Lynn W. Marples, MBA
Peggy L. O'Kelly, MBA

Assistant Professors

Brenda H. Anderson, PhD
Amitabh Dugar, PhD
James J. Maroney, PhD
Timothy J. Rupert, MS
Marjorie K. Shelley, PhD

Finance and Insurance Group

Professors
Wesley W. Marple, Jr., DBA
Joseph W. Meador, PhD
Harlan D. Platt, PhD
Jonathan B. Welch, PhD

Associate Professors
Paul J. Bolster, PhD
Jeffery A. Born, PhD
Donald G. Margotta, PhD
Coleen C. Pantalone, PhD

Assistant Professors

Alan D. Alford, PhD
Vahan Janjigian, PhD
Mark Kazarosian, PhD
Steven R. Kursh, PhD
Robert M. Mooradian, PhD
Donald Rich, PhD
Harley E. Ryan, Jr., PhD
Carolyn D. Schellhorn, PhD
Emery A. Trahan, PhD
Shiawee X. Yang, PhD

Lecturer

Peggy L. Fletcher, MBA

General Management Group

Professors
Roger M. Atherton, PhD
Charles D. Baker, MBA
Robert C. Lieb, DBA
Daniel J. McCarthy, DBA
Ravi Sarathy, PhD
Heidi Vernon-Wortzel, PhD

Associate Professors

William F. Crittenden, PhD
Raymond M. Kinnunen, DBA
Marc H. Meyer, PhD
James F. Molloy, Jr., PhD
Carl W. Nelson, PhD
Ravi Ramamurti, DBA

Assistant Professor

Nicholas Athanassiou, PhD

Lecturers

Stanley R. Berkowitz, JD
Joseph W. Chevarley, DBA
James S. Cook, AB
Mary F. Costello, JD
Robert L. Goldberg, MBA
Louise Kelly, MBA
Richard P. Olsen, DBA
Ronald S. Thomas, PhD

Human Resources Group

Professors
David P. Boyd, PhD
Ralph Katz, PhD

Associate Professors

Rae Andre, PhD
Brendan D. Bannister, DBA
Thomas M. Begley, PhD
Cynthia Lee, PhD
Edward F. McDonough III, PhD
Sheila M. Puffer, PhD
Bert A. Spector, PhD
Francis C. Spital, PhD
Edward G. Wertheim, PhD

Assistant Professor

Judith Y. Weisinger, PhD

Management Science Group**Professors**

Sangit Chatterjee, PhD
Michael J. Maggard, PhD
Robert A. Millen, PhD

Associate Professors

Ramaiya Balachandra, PhD
Kathleen Foley Curley, PhD
Victor B. Godin, DBA
Robert A. Parsons, MA
Marius M. Solomon, PhD
Eileen M. Trauth, PhD
Merrill E. Warkentin, PhD
Mustafa R. Yilmaz, PhD

Assistant Professor

Michael H. Zack, DBA

Lecturers

Richard J. Briotta, MBA
Mohamed Habibullah, PhD
Erl Sorensen, PhD

Marketing Group**Professors**

Samuel Rabino, PhD
Frederick Wiseman, PhD

Associate Professors

Dan T. Dunn, Jr., DBA
Fareena Sultan, PhD
Robert F. Young, DBA

Assistant Professors

Gloria Barczak, PhD
Bruce H. Clark, PhD
E. Craig Stacey, PhD

Programs in the College of Business Administration are designed for students who are preparing to take on managerial responsibility. These programs help students develop the ability to recognize and solve business and organizational problems and understand the role of business in the community, the nation, and the world.

The college's goal is to help students develop ideals that are ethically sound and socially desirable; cultivate an awareness of the social, political, and economic developments to which businesses must adapt; develop sound judgment and effective communication skills; and develop their individual interests and talents.

Modern business faces many challenges from unprecedented political change and the effects of foreign policy, high technology, affirmative-action regulations, and new economic policies. These challenges have increased the demand for highly trained individuals equipped to analyze and address our economy's complex social and legal problems.

The college offers a Bachelor of Science degree in international business and in business administration with concentrations in accounting, entrepreneurship and small business management, finance and insurance, human resources management, international business, logistics and transportation, management, management information systems, and marketing. The business curriculum is enhanced by courses in the sciences, humanities, and social sciences. In addition to their academic courses, all students are required to complete a five-year or a four-year cooperative education plan.

Co-op provides a learning experience beyond the classroom. Textbook examples come to life in real-world business settings. Classroom theories are applied to actual business problems. In turn, these experiences serve to stimulate inquiry and discussion back in the classroom. This interaction between college studies and cooperative education sets the stage for a lifetime of learning.

The undergraduate program of the College of Business Administration meets the standards of the American Assembly of Collegiate Schools of Business for faculty and student quality, curriculum design, and overall University support.

Business majors go on to graduate work in business as well as public health-care and education administration. Many careers in law also require an understanding of business concepts. Although the Association of American Law Schools does not recommend particular courses for prelegal students, it does advise undergraduates to develop critical understanding of the institutions and values with which the law deals.

Class Entrance Requirements

Listed below are the quality-point averages required for students to advance to the next class year and to graduate.

	Overall QPA	Freshman Core Courses QPA*	Business Courses QPA
Sophomore	1.4	1.8	1.8
Middler	1.9		1.9
Junior	2.0		2.0
Senior	2.0		2.0
To graduate	2.0		2.0

*Freshman Core Courses refers to Freshman English I and II, Macro and Micro Economics, Calculus for Business, and Introduction to Business.

Graduation Requirements

Bachelor of Science degree candidates must complete all prescribed work of the curriculum in which they seek to qualify, currently 176 quarter hours. The degree not only represents the formal completion of selected courses, but also indicates professional study in the major or concentration. A quality-point average of C (2.0) and a C average in all business courses are required for graduation. Students must be enrolled in a full program of studies in the College of Business Administration during the final three quarters preceding graduation.

Minor in Business Administration

All courses in the College of Business Administration are available to all nonbusiness students at Northeastern University if they meet the class standing and course requirements. Nonbusiness students may find the minor attractive if they are considering a career in business or pursuing an MBA. The minor consists of eight courses. Students who wish to enter the program should speak with an adviser in the Undergraduate Business Programs Office upon successful completion of at least the macro economics and college algebra courses. Students who complete all eight courses successfully and have earned at least a C (2.0) average in them will be awarded a minor in Business Administration at graduation.

Minor Curriculum

Background courses: MTH 1101, Applications of Algebra *or* MTH 1106, Functions and Algebra *or* MTH 1113, College Math for Business and Economics *or* better; ECN 1115, Principles of Macroeconomics.

Required courses: MGT 1115, Introduction to Business; ACC 1111, Financial Accounting; HRM 1432, Organizational Behavior *or* HRM 1431, Complex Organizations; FIN 1438, Principles of Finance 1; MKT 1435, Introduction to Marketing. Plus one of the following: MGT 1450, Business Policy; ENT 1330, Entrepreneurship; INB 1338, Introduction to International Business; MSC 1441, Operations Management.

Certificate programs. The College offers a number of certificate programs which recognize a business or nonbusiness student's acquired expertise in specified areas of specialization.

Five-Year Bachelor of Science Curriculum for First Three Quarters

The courses taken in the first three quarters of the five-year program are the same for all concentrations.

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| Quarter 1 | ECN 1115, Principles of Macroeconomics; ENG 1110, Freshman English 1; and two arts and sciences electives. |
| Quarter 2 | MGT 1115, Introduction to Business; MTH 1114, Calculus for Business; and two arts and sciences electives. |
| Quarter 3 | ECN 1116, Principles of Microeconomics; ENG 1111, Freshman English 2; and two arts and sciences electives. |

Four-Year Bachelor of Science Curriculum for First Five Quarters

The courses taken in the first five quarters of the four-year program are the same for all concentrations.

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| Quarter 1 | MGT 1115, Introduction to Business; non-business elective <i>or</i> MTH 1113, Mathematics for Business and Economics; ENG 1110, Freshman English 1, and a non-business elective. |
| Quarter 2 | ECN 1115, Principles of Macroeconomics; MTH 1114, Calculus for Business; and two non-business electives. |
| Quarter 3 | ECN 1116, Principles of Microeconomics; ENG 1111, Freshman English 2; and three non-business electives. |
| Quarter 4 | ACC 1111, Financial Accounting; MSC 1200, Business Statistics 1; MSC 1226, Computer Based Information Systems; and a non-business elective. |
| Quarter 5 | ACC 1112, Managerial Accounting; MSC 1201, Business Statistics 2; ENG 1381, Writing for the Professions: Business Administration; and two non-business electives. |

Accounting

A concentration in accounting prepares the graduate for entry into one of the fastest growing and most critical areas of management. Accounting is an exacting field that requires accuracy, the ability to reason, and the skills to interpret business data and to deal with people. Accountants hold sensitive management positions in private firms in business or industry, public accounting firms, and governmental agencies.

To prepare for an accounting career, students take courses in financial and managerial reporting, systems design and installation, taxation, and auditing. Elective courses are available for more specialized study in cost accounting, accounting theory, planning and control, auditing, and taxes.

Students may also count up to eighteen months of cooperative education experience in auditing toward the three years required to become a Certified Public Accountant.

Five-Year Bachelor of Science Curriculum

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|--------------|--|
| Quarters 1-3 | See above. |
| Quarter 4 | ACC 1111, Financial Accounting; MSC 1200, Business Statistics 1; MSC 1226, Computer-Based Information Systems; and one nonbusiness elective. |

Four-Year Bachelor of Science Curriculum

Quarter 5	ACC 1112, Managerial Accounting; MSC 1201, Business Statistics 2; a nonbusiness elective; and an open elective.
Quarter 6	ACC 1331, Intermediate Accounting 1; FIN 1438, Principles of Finance 1; and HRM 1433, Organizational Behavior and Design.
Quarter 7	ACC 1332, Intermediate Accounting 2; ACC 1339, Cost Accounting; FIN 1439, Principles of Finance 2; and MKT 1435, Introduction to Marketing.
Quarter 8	ACC 1343, Intermediate Accounting 3; ACC 1345, Accounting Systems; MSC 1441, Operations Management; and one nonbusiness elective.
Quarter 9	ACC 1347, Auditing; MSC 1433, Quantitative Models in Business; MGT 1446, Managing Social Issues; and upper division writing requirement.
Quarter 10	ACC 1351, Federal Income Tax 1; MGT 1450, Business Policy; and two open electives.
Quarter 11	Three open electives and a nonbusiness elective.
Quarters 1–5	See page 83.
Quarter 6	ACC 1331, Intermediate Accounting 1; ACC 1339, Cost Accounting; FIN 1438, Principles of Finance 1; MSC 1441, Operations Management.
Quarter 7	ACC 1332, Intermediate Accounting 2; MKT 1435, Introduction to Marketing; FIN 1439, Principles of Finance 2; HRM 1433, Organizational Behavior and Design.
Quarter 8	ACC 1343, Intermediate Accounting 3; MGT 1446, Managing Social Issues; MSC 1433, Quantitative Models in Business; and an open elective.
Quarter 9	ACC 1351, Federal Income Tax 1; MGT 1450, Business Policy; ACC 1345, Accounting Systems; and two open electives.
Quarter 10	ACC 1347, Auditing; and three open electives.

Entrepreneurship and Small Business Management

The concentration in entrepreneurship and small business management helps students develop the skills needed to work effectively within a small business or to start or acquire and manage their own.

Students learn to assess their personal aptitude and potential for small business; find and evaluate business opportunities; secure essential funding; and organize and manage such functional business areas as manufacturing, marketing, accounting, and finance. They will learn these important skills by taking courses in entrepreneurship, starting and managing new businesses, small business finance, and planning and growing new ventures.

This concentration also helps students prepare for careers in sales management, banking, public accounting, and other areas relevant to the small business environment.

During their senior year, students participate in the Small Business Institute Field Project. Offered in conjunction with the United States Small Business Administration, this unique course offers students the chance to work, under faculty guidance, as consultants to small business owners; students analyze company needs and help develop practical solutions to actual management problems.

Five-Year Bachelor of Science Curriculum

Quarters 1–3	See page 83.
Quarter 4	ACC 1111, Financial Accounting; MSC 1200, Business Statistics 1; MSC 1226, Computer-Based Information Systems; and one nonbusiness elective.
Quarter 5	ACC 1112, Managerial Accounting; MSC 1201, Business Statistics 2; and two nonbusiness electives.
Quarter 6	ENT 1330, Management of Smaller Enterprises; FIN 1438, Principles of Finance 1; MKT 1435, Introduction to Marketing; and an open elective.
Quarter 7	FIN 1439, Principles of Finance 2; HRM 1433, Organizational Behavior and Design; and MSC 1433, Quantitative Models in Business.
Quarter 8	ENT 1344, Opportunity Analysis and Venture Capital; a nonbusiness elective; an open elective; and upper division writing requirement.
Quarter 9	FIN 1770, Small Business Finance; MGT 1446, Managing Social Issues; MSC 1441, Operations Management; and an open elective.
Quarter 10	MGT 1450, Business Policy; ENT 1352, New Venture Creation; and two open electives.
Quarter 11	ENT 1358, Small Business Institute Field Project; and two open electives.

Four-Year Bachelor of Science Curriculum

Quarters 1–5	See page 83.
Quarter 6	MKT 1435, Introduction to Marketing; FIN 1438, Principles of Finance 1; MSC 1441, Operations Management; and one open elective.
Quarter 7	ENT 1330, Small Business Management; FIN 1439, Principles of Finance 2; HRM 1433, Organizational Behavior and Design; and one open elective.
Quarter 8	FIN 1770, Small Business Finance; MGT 1446, Managing Social Issues; ENT 1344, Opportunity Analysis and Venture Capital; MSC 1433, Quantitative Models in Business.
Quarter 9	MGT 1450, Business Policy; and four open electives.
Quarter 10	ENT 1352, New Venture Creation; ENT 1358, Small Business Institute Project; and an open elective.

Finance and Insurance

The role of people trained in finance and insurance is expanding rapidly within the business world. Changes on the financial scene—rising securities prices, fluctuating inflation and interest rates, and scarcity of capital—have created an awareness that financial knowledge is essential to the effective management of business firms.

Finance is the management and investment of money and other assets for business, financial institutions, nonprofit organizations, governments, and individuals.

The program draws on accounting principles, economic theory, and quantitative methods to direct the way money is managed, acquired, and distributed. Students learn how economic systems operate and how money markets work within economic systems. They also learn to analyze economic trends and indications and to examine the movement and distribution of money.

Students may specialize in one or more of the following areas: management finance, investment management and analysis, management of financial institutions, insurance and risk management, real estate, and financial planning. The program prepares students for careers in financial management, security analysis, investment management, security or insurance brokerage, underwriting, credit management, and risk management with corporations, commerce banks, insurance companies, and other financial institutions.

Five-Year Bachelor of Science Curriculum

Quarters 1–3	See page 83.
Quarter 4	ACC 1111, Financial Accounting; MSC 1200, Business Statistics 1; and two non-business electives.
Quarter 5	ACC 1112, Managerial Accounting; MSC 1201, Business Statistics 2; MSC 1226, Computer-Based Information Systems; and a nonbusiness elective.
Quarter 6	FIN 1438, Principles of Finance 1; FIN 1333, Financial Institutions and Markets; MKT 1435, Introduction to Marketing; and a nonbusiness elective.
Quarter 7	FIN 1439, Principles of Finance 2; HRM 1433, Organizational Behavior and Design; and MSC 1433, Quantitative Models in Business.
Quarter 8	FIN 1335, Managerial Finance; FIN 1346, Investment Management; upper-division writing requirement; and an open elective.
Quarter 9	MSC 1441, Operations Management; MGT 1446, Managing Social Issues; finance elective; and an open elective.
Quarter 10	MGT 1450, Business Policy; finance elective; and two open electives.
Quarter 11	Finance elective and three open electives.

Four-Year Bachelor of Science Curriculum

Quarters 1–5	See page 83.
Quarter 6	FIN 1438, Principles of Finance 1; FIN 1333, Financial Institutions and Markets; MSC 1441, Operations Management; and one open elective.
Quarter 7	FIN 1439, Principles of Finance 2, MKT 1435, Introduction to Marketing; HRM 1433, Organizational Behavior and Design; and one open elective.
Quarter 8	FIN 1335, Managerial Finance; MGT 1446, Managing Social Issues; MSC 1433, Quantitative Models in Business; and one open elective.
Quarter 9	FIN 1346, Investment Management; MGT 1450, Business Policy; one finance elective; and two open electives.
Quarter 10	Two finance electives and two open electives.

Human Resources Management

Human resources management (HRM) focuses on the effective utilization of people at work. Traditionally, the major areas of HRM include employee relations, recruitment, selection, compensation, and training. Although expertise in these areas is necessary, major changes in the field have led to a more strategic role for the human resources professional. Today, human resource managers must be skilled in job and organizational design, innovative career planning, and leading effective internal change.

The successful management of human resources calls for a partnership among human resources professionals, labor relations negotiators, wage and salary analysts, and operating line managers in a company's functional areas (marketing, finance, and production). With the challenges brought about by an increasingly diverse work force and rapid international expansion, however, the importance of HRM has increased dramatically in recent years. HRM professionals now oversee organizational compliance with equal-opportunity laws, institute affirmative action procedures, and design or manage participative work systems.

Coursework focuses on a wide range of issues that affect human resources management: labor issues, negotiating strategies, psychological principles underlying organizational and human behavior, job enrichment, and organizational development activities.

Five-Year Bachelor of Science Curriculum

Quarters 1–3	See page 83.
Quarter 4	ACC 1111, Financial Accounting; MSC 1200, Business Statistics 1; MSC 1226, Computer-Based Information Systems; and one nonbusiness elective.
Quarter 5	ACC 1112, Managerial Accounting; MSC 1201, Business Statistics 2; and two non-business electives.
Quarter 6	FIN 1438, Principles of Finance 1; HRM 1433, Organizational Behavior and Design; and MSC 1433, Quantitative Models in Business.
Quarter 7	FIN 1439, Principles of Finance 2; HRM 1332, Introduction to Human Resource Management; MKT 1435, Introduction to Marketing; and an open elective.
Quarter 8	HRM 1348, Reward Systems; HRM 1349, Assessment of Prospective Employees; MSC 1441, Operations Management; and an open elective.
Quarter 9	MGT 1446, Managing Social Issues; human resources management elective; upper division writing requirement; and an open elective.
Quarter 10	HRM 1345, Contemporary Labor Issues; MGT 1450, Business Policy; human resources management elective; and an open elective.
Quarter 11	Nonbusiness elective and three open electives.

Four-Year Bachelor of Science Curriculum

Quarters 1–5	See page 83.
Quarter 6	FIN 1438, Principles of Finance 1; MSC 1441, Operations Management; HRM 1433, Organizational Behavior and Design.
Quarter 7	HRM 1332, Introduction to Human Resource Management; FIN 1439, Principles of Finance 2; MKT 1435, Introduction to Marketing; and two open electives.
Quarter 8	HRM 1345, Contemporary Labor Issues; MSC 1433, Quantitative Models in Business; MGT 1446, Managing Social Issues; and one HRM elective.
Quarter 9	HRM 1348, Reward Systems; HRM 1349, Selection and Assessment; MGT 1450, Business Policy; and two open electives.
Quarter 10	Human resources management elective and three open electives.

International Business Administration

The recent growth of multinational firms, international trade, and regional international trading blocs has created a shortage of skilled managers who are equipped to analyze the complexities of international business.

The international business administration concentration fosters an understanding of problems involved in operating businesses across national boundaries and analyzes the operations of businesses in multinational environments.

It is increasingly common for multinational firms to require that candidates for top management positions have prior experience in international operations. In addition, large banks and insurance companies, governments, trade associations, and transnational bodies also have a growing need for managers who understand international business issues.

The concentration in international business administration includes broad-based courses dealing with the international environment as well as functional business courses with an international focus. Some of these courses are offered by the College of Business Administration; those in the

humanities and social sciences are offered by the College of Arts and Sciences. All courses in the international business administration concentration are available to students in other concentrations during their middle, junior, and senior years.

Since most careers in international business begin in a functional area that has an international component, students are encouraged to complete a dual concentration. For example, students may combine a concentration in international business administration with one in finance, marketing, accounting, or human resources management. Students are also encouraged to develop competency in a foreign language, a skill viewed as a major asset by many prospective employers.

The College of Business Administration has extensive international contacts that enable many students to participate in international cooperative work experiences or internships.

Five-Year Bachelor of Science Curriculum

Quarters 1–3	See page 83.
Quarter 4	ACC 1111, Financial Accounting; MSC 1200, Business Statistics 1; and two non-business electives.
Quarter 5	ACC 1112, Managerial Accounting; MSC 1201, Business Statistics 2; MSC 1226, Computer-Based Information Systems; and one open elective.
Quarter 6	FIN 1438, Principles of Finance 1; HRM 1433, Organizational Behavior and Design; and INB 1338, Introduction to International Business.
Quarter 7	FIN 1439, Principles of Finance 2; MKT 1435, Introduction to Marketing; and MSC 1433, Quantitative Models in Business; and an open elective.
Quarter 8	MSC 1441, Operations Management; a business elective; an international non-business elective; and an open elective.
Quarter 9	FIN 1759, International Financial Markets; MGT 1446, Managing Social Issues; upper division writing requirement; and an international business elective.
Quarter 10	MGT 1450, Business Policy; an international nonbusiness elective; and two open electives.
Quarter 11	INB 1352, Seminar in International Business; an international business elective; and two open electives.

Four-Year Bachelor of Science Curriculum

Quarters 1–5	See page 83.
Quarter 6	INB 1338, Introduction to International Business; FIN 1438, Principles of Finance 1; MKT 1435, Introduction to Marketing; MSC 1441, Operations Management.
Quarter 7	FIN 1439, Principles of Finance 2; HRM 1433, Organizational Behavior and Design; and two open electives.
Quarter 8	MGT 1446, Managing Social Issues; MSC 1433, Quantitative Models in Business; one IB elective; and one open elective.
Quarter 9	FIN 1759, International Financial Markets; MGT 1450, Business Policy; one business elective; and two open electives.
Quarter 10	INB 1352, Seminar in International Business; one IB elective; and two open electives.

Logistics and Transportation

From the Fortune 500 manufacturer to the small retail firm that produces, sells, or distributes products, all companies have a logistics function that must be effectively managed if they are to be competitive. A logistics manager is typically involved in making critical decisions about such matters as the modes of transportation used to move the company's materials and products, inventory policies, warehousing needs, and the location of facilities.

As American corporations become increasingly involved in global markets, logistics managers play a major role not only in assessing the feasibility of international activity, but also in developing distribution networks to support that involvement. Logistics management is one of the most rapidly expanding areas of business.

The academic work in the program flows from introductory courses in transportation through advanced study in physical distribution management. Electives then provide in-depth examinations of how goods and services reach their destinations. The program culminates in a senior seminar. Courses address not only the viewpoints of corporate shippers and carriers, but also those of public officials and consumer advocates.

Logistics and transportation managers frequently interact with managers from other functional areas; it is useful for a student therefore to complete a dual concentration in finance, marketing, or another functional area.

In addition to corporations, companies (carriers) that sell transportation services offer rewarding career opportunities. The nation's carriers, including the airlines, railroads, trucking companies, and urban transit systems, increasingly rely on individuals who are skilled in logistics and transportation management.

Students interested in public policy and administration may pursue careers with the federal, state, and local government agencies involved in the financing and the economic and safety regulation of the transportation infrastructure.

Five-Year Bachelor of Science Curriculum

Quarters 1–3	See page 83.
Quarter 4	ACC 1111, Financial Accounting; MSC 1200, Business Statistics 1; and two non-business electives.
Quarter 5	ACC 1112, Managerial Accounting; MSC 1201, Business Statistics 2; MSC 1226, Computer-Based Information Systems; and a nonbusiness elective.
Quarter 6	FIN 1438, Principles of Finance 1; HRM 1433, Organizational Behavior and Design; and TRN 1333, The Domestic Transportation System.
Quarter 7	FIN 1439, Principles of Finance 2; a transportation elective; MKT 1435, Introduction to Marketing; and MSC 1433, Quantitative Models in Business.
Quarter 8	MSC 1441, Operations Management; a transportation elective; a nonbusiness elective; and an open elective.
Quarter 9	MGT 1446, Managing Social Issues; TRN 1344, Corporate Transportation/Logistics; an open elective; and an upper division writing requirement.
Quarter 10	MGT 1450, Business Policy; a transportation elective; and two open electives.
Quarter 11	TRN 1353, Seminar in Transportation; and three open electives.

Four-Year Bachelor of Science Curriculum

Quarters 1–5	See page 83.
Quarter 6	TRN 1333, Domestic Transportation System; FIN 1438, Principles of Finance 1; MKT 1435, Introduction to Marketing; MSC 1441, Operations Management.
Quarter 7	FIN 1439, Principles of Finance 1; HRM 1433, Organizational Behavior and Design; one TRN elective; and one open elective.
Quarter 8	MGT 1446, Managing Social Issues; MSC 1433, Quantitative Models in Business; and two open electives.
Quarter 9	MGT 1450, Business Policy; TRN 1344, Business/Logistics; one TRN elective; and two open electives.
Quarter 10	TRN 1353, Seminar in Transportation and Logistics; one TRN elective; and two open electives.

Management

The concentration in management is designed for the student with a strong interest in motivating people to provide goods and services creatively and productively.

The program helps students understand the various aspects of administrative practice and develop judgment and skills in organizational problem analysis and decision making. It focuses on three functional areas—marketing, finance, and operations—and explores the interrelation of these areas and the ways they can be used as management tools. To these are added the perspectives of law, accounting, and management information systems. Finally, the concentration includes several courses on business policy that are intended to develop skills in both the integrative and strategic roles of management.

Through extensive use of case studies, management simulations, and group research projects, students develop leadership skills. Faculty pay significant attention to “people problems” in order to stress the importance of developing an effective work force.

Five-Year Bachelor of Science Curriculum

Quarters 1–3	See page 83.
Quarter 4	ACC 1111, Financial Accounting; MSC 1200, Business Statistics 1; and two non-business electives.
Quarter 5	ACC 1112, Managerial Accounting; MSC 1201, Business Statistics 2; MSC 1226, Computer-Based Information Services; and a nonbusiness elective.
Quarter 6	FIN 1438, Principles of Finance 1; HRM 1433, Organizational Behavior and Design; and MSC 1433, Quantitative Models in Business.

Quarter 7	MSC 1341, Information Resource Management; FIN 1439, Principles of Finance 2; MKT 1331, Marketing Management; and MKT 1435, Introduction to Marketing.
Quarter 8	MGT 1345, Legal Aspects of Business; MSC 1441, Operations Management; a business elective; and an open elective.
Quarter 9	MGT 1446, Managing Social Issues; a business elective; an open elective; and upper division writing requirement.
Quarter 10	MGT 1450, Business Policy; a nonbusiness elective; and two open electives.
Quarter 11	Business elective and three open electives.
Quarters 1–5	See page 83.
Quarter 6	FIN 1438, Principles of Finance 1; MKT 1435, Introduction to Marketing; MSC 1441, Operations Management; and one business elective.
Quarter 7	MKT 1331, Marketing Management; FIN 1439, Principles of Finance 2; HRM 1433, Organizational Behavior and Design; and one open elective.
Quarter 8	MGT 1446, Managing Social Issues; MSC 1433, Quantitative Models in Business; and two open electives.
Quarter 9	MSC 1341, Information Resource Management; MGT 1450, Business Policy; MGT 1345, Legal Aspects of Business; and two open electives.
Quarter 10	HRM 1350, Strategic Management of Human Resources; MGT 1350, Advanced Strategic Management; and two open electives.

Four-Year Bachelor of Science Curriculum

Management Information Systems

The concentration in management information systems (MIS) is designed to teach tomorrow's managers how to derive the maximum benefit from state-of-the-art information technology.

The program provides a background in two distinct tracks. The first builds on the historical development of large and powerful computers that carry out organization-wide tasks, such as database management. The second track, often referred to as "end-user computing," deals with the direct linkage of decision makers and user-friendly computer facilities.

Through an in-depth examination of case studies, the capstone senior year course, Business Systems Integration, illustrates how management information technology is used to identify and solve an organization's information-related problems.

MIS managers interact frequently with other managers throughout an organization; therefore students are encouraged to complete a dual concentration in one of the functional areas of management.

Five-Year Bachelor of Science Curriculum

Quarters 1–3	See page 83.
Quarter 4	ACC 1111, Financial Accounting; MSC 1200, Business Statistics 1; and two non-business electives.
Quarter 5	ACC 1112, Managerial Accounting; MSC 1201, Business Statistics 2; MSC 1226, Computer-Based Information Systems; and one open elective.
Quarter 6	FIN 1438, Principles of Finance 1; HRM 1433, Organizational Behavior and Design; and an open elective.
Quarter 7	FIN 1439, Principles of Finance 2; MKT 1435, Introduction to Marketing; MSC 1335, Telecommunications and Networks; and MSC 1433, Quantitative Models in Business.
Quarter 8	MSC 1441, Operations Management; MSC 1330, Data Management; MSC 1332, Decision Support Systems for Business; and a nonbusiness elective.
Quarter 9	MGT 1446, Managing Social Issues; MSC 1336, Business Programming; upper division writing requirement; and a nonbusiness elective.
Quarter 10	MGT 1450, Business Policy; MSC 1350, Database Management Systems; MSC 1341, Information Resource Management; and one open elective.
Quarter 11	MSC 1342, Business Systems Integration; and three open electives.
Quarters 1–5	See page 83.
Quarter 6	MSC 1335, Telecommunications and Networks; FIN 1438, Principles of Finance 1; MKT 1435, Introduction to Marketing; MSC 1441, Operations Management.

Four-Year Bachelor of Science Curriculum

Quarter 7	MSC 1336, Business Programming; FIN 1439, Principles of Finance 2; HRM 1433, Organizational Behavior and Design; and one open elective.
Quarter 8	MSC 1341, Information Resource Management; MSC 1433, Quantitative Models in Business; MGT 1446, Managing Social Issues; and one open elective.
Quarter 9	MSC 1330, Data Management; MGT 1450, Business Policy; MSC 1332, Business Support Systems for Business; and two open electives.
Quarter 10	MSC 1342, Business Systems Integration; and three open electives.

Marketing

A business not only designs and manufactures products, but also markets and sells them to manufacturers, wholesalers, retailers, and consumers. All the activities that direct the flow of goods and services from producer to consumer are classified as marketing concerns. Once an organization determines a customer's needs and wants, its first objective is to produce goods or services to satisfy that particular consumer. Essential in all types of businesses are product design, research, pricing, packaging, transportation, advertising, selling, and servicing.

The concentration in marketing is designed to familiarize students with the marketing process and to provide them with the theoretical concepts, skills, and tools necessary to successfully enter and advance in one of the many possible career paths. Students learn to evaluate consumer behavior, employ advertising principles, utilize market research and testing, and develop ways to position products and services in a favorable light. They also explore the changing economic, political, legal, ethical, and cultural contexts in which marketing strategies must be developed.

Students may select courses that lead to one of many career paths within marketing: product or brand management, marketing research, advertising management, retail management, sales management, or international marketing management.

Five-Year Bachelor of Science Curriculum

Quarters 1–3	See page 83.
Quarter 4	ACC 1111, Financial Accounting; MSC 1200, Business Statistics 1; MSC 1226, Computer-Based Information Systems; and a nonbusiness elective.
Quarter 5	ACC 1112, Managerial Accounting; MSC 1201, Business Statistics 2; and two nonbusiness electives.
Quarter 6	FIN 1438, Principles of Finance 1; MKT 1435, Introduction to Marketing; MSC 1433, Quantitative Models in Business; and a nonbusiness elective.
Quarter 7	FIN 1439, Principles of Finance 2; HRM 1433, Organizational Behavior and Design; and MKT 1331, Marketing Management.
Quarter 8	MKT 1341, Marketing Research; a marketing elective; an open elective; and upper division writing requirement.
Quarter 9	MGT 1446, Managing Social Issues; MSC 1441, Operations Management; a marketing elective; and an open elective.
Quarter 10	MKT 1351, Competitive Strategy; MGT 1450, Business Policy; and two open electives.
Quarter 11	Marketing elective and three open electives.

Four-Year Bachelor of Science Curriculum

Quarters 1–5	See page 83.
Quarter 6	MKT 1435, Introduction to Marketing; FIN 1438, Principles of Finance 1; MSC 1441, Operations Management; and one open elective.
Quarter 7	MKT 1331, Marketing Management; FIN 1439, Principles of Finance 2; HRM 1433, Organizational Behavior and Design; and one open elective.
Quarter 8	MKT 1341, Marketing Research; MGT 1446, Managing Social Issues; MSC 1433, Quantitative Models in Business; and one MKT elective.
Quarter 9	MKT 1351, Competitive Strategy; MGT 1450, Business Policy; one MKT elective; and two open electives.
Quarter 10	Marketing elective and three open electives.

International Business

The College of Business Administration is offering a new and innovative degree program, the Bachelor of Science in international business. This program, the first of its kind in the United States, is for the highly motivated student who plans a career in import/export, international finance or manufacturing, or other areas that involve global markets.

Bachelor of Science in International Business

Students are admitted to a French, Spanish, or German track. They develop fluency in their chosen language and study the culture of the country or countries where that language is spoken. In addition, they participate in at least one cooperative education work experience or internship abroad in order to sharpen their language and business skills.

All students in the Bachelor of Science in International Business degree program must take the required courses in the international business administration concentration (see page 82) and are encouraged to develop skills in other business areas such as finance, marketing, management, or human resources.

College of Computer Science

Larry A. Finkelstein, PhD, *Dean*

Agnes H. Chan, PhD, *Associate Dean and Director of Graduate Studies*

Richard A. Rasala, PhD, *Associate Dean and Director of Undergraduate Studies*

Marie P. Hinds, BS, *Assistant to the Dean*

Professors

Agnes H. Chan, PhD
Gene D. Cooperman, PhD
Harriet J. Fell, PhD
Larry A. Finkelstein, PhD
Karl J. Lieberherr, PhD
Richard A. Rasala, PhD
Betty J. Salzberg, PhD
Raoul N. Smith, PhD
Mitchell Wand, PhD
Patrick S. P. Wang, PhD

Joint Professor

R. Mark Goresky, PhD
Mathematics

Associate Professors

Kenneth P. Baclawski, PhD
John Casey, BA
William D. Clinger, PhD
Robert P. Futrelle, PhD
Carole D. Hafner, PhD
Viera K. Proulx, PhD
Ronald J. Williams, PhD
Bryant W. York, PhD

Assistant Professors

Ibrahim M. Matta, PhD
Boaz Patt-Shamir, PhD

The invention of powerful computers and the development of complex software programs have fundamentally transformed the way people work and live. Computers are now essential tools in business, industry, science, medicine, and human services. Computers also enhance the efforts of individuals and volunteer groups to meet their goals. In addition, the most sophisticated work in music, film, and video often makes use of computer technology. The College of Computer Science believes that computing is one of the most exciting fields of study and that its applications are limitless.

In the College of Computer Science, students learn about the principles and practices which support the development of high quality software. Computer science as a discipline draws its inspiration from many fields: mathematics, science, engineering, and art. From mathematics, students learn to think logically and to build complex structures from simple and secure components. From the experimental sciences, students learn to estimate the performance of algorithms and then test these estimates in real life. From engineering, students learn to treat program design as a complicated set of tradeoffs between computer resources (execution time, memory needs, peripherals), programmer resources (development time and available software tools), and customer needs (what must be done and how soon). Finally, from art, students learn to value the beauty of the internal program code as well as the quality of the external user interface. The College of Computer Science trains its students to understand and practice the diverse skills that are needed to make a significant contribution to the field of computing.

The undergraduate program in the College of Computer Science treats a variety of subject areas in computing, such as algorithms, data structures, programming language design, compilers, computer architecture, operating systems, database systems, graphics, artificial intelligence, and parallel computing. Qualified students may choose electives from a wide range of more advanced graduate courses. Students may also work individually with professors on research projects or may volunteer with the systems staff in order to enhance their technical experience.

The college offers two undergraduate degrees. The Bachelor of Science emphasizes strong technical competence in computer science, mathematics, physics, and electrical engineering. The Bachelor of Arts combines a computer science major with a broad-based liberal arts education. The Bachelor of Science program is accredited by the Computer Science Accreditation Board.

Normally, the undergraduate degree program is five years, including seven quarters of on-the-job cooperative education in industry. Students may complete the program in four years with a reduced cooperative education component. Because the experience acquired in industry can contribute tremendously to a student's academic and personal development, the college is strongly committed to the principle of cooperative education.

Class Entrance Requirements

The minimum overall quality-point averages listed are required for students to advance to the next rank and to graduate.

Sophomore	1.7
Middler	1.9
Junior	2.0
Senior	2.0
To graduate	2.0

In addition, a minimum quality-point average of 2.0 in all computer science courses (any course number with a COM prefix) is required for graduation. For additional information, consult the *College of Computer Science Undergraduate Student Guidebook*.

This minor is particularly valuable to non-computer science students seeking positions where a familiarity with computer science concepts and techniques is desirable. Four required level-one courses must be completed, plus three additional computer science courses elected from a number of courses specified by the college. Details may be obtained from the dean's office.

Minor in Computer Science

Five-Year Bachelor of Science Curriculum

Quarter 1	COM 1100, Fundamentals of Computer Science; COM 1121, Computer Science Overview 1; ENG 1110, Freshman English 1; MTH 1123, Calculus 1; and one basic social science.
Quarter 2	COM 1101, Algorithms and Data Structures 1; COM 1122, Computer Science Overview 2; MTH 1124, Calculus 2; MTH 1137, Discrete Mathematics 1; and one basic social science.
Quarter 3	COM 1201, Algorithms and Data Structures 2; ENG 1111, Freshman English 2; MTH 1125, Calculus 3; and one sub-area or general elective.
Quarter 4	COM 1130, Computer Organization and Design; MTH 1223, Calculus 4; PHY 1221, Physics 1; PHY 1521, Physics 1 Lab; and one sub-area or general elective.
Quarter 5	COM 1204, Object-Oriented Design; ECE 1178, Digital Electronics for Computer Science; PHY 1222, Physics 2; PHY 1522, Physics 2 Lab; and MTH 1240, Chaos and Fractals.
Quarter 6	COM 1330, Operating Systems Concepts; ECE 1229, Digital Systems Lab; ECE 1382, Computer Engineering 2; PHY 1223, Physics 3; and one sub-area or general elective.
Quarter 7	COM 1102, Functional Programming and Applications; COM 1350, Automata and Formal Language; ENG 1125, Technical Writing 1; and one sub-area or general elective.
Quarter 8	COM 1205, Software Design; MTH 1301, Linear Algebra 1; SOC 1485, Computers and Society; and one computer science elective.
Quarter 9	MTH 1387, Probability 1; two computer science electives; and one sub-area or general elective.
Quarter 10	COM 1390, Algorithms; one computer science elective; and two sub-area or general electives.
Quarter 11	COM 1621, Computer Science Seminar; one computer science elective; and three sub-area or general electives.

Four-Year Bachelor of Science Curriculum

Quarter 1	COM 1100, Fundamentals of Computer Science; COM 1121, Computer Science Overview 1; ENG 1110, Freshman English 1; MTH 1123, Calculus 1; and one basic social science.
Quarter 2	COM 1101, Algorithms and Data Structures 1; COM 1122, Computer Science Overview 2; MTH 1124, Calculus 2; MTH 1137, Discrete Mathematics 1; and one basic social science.
Quarter 3	COM 1201, Algorithms and Data Structures 2; ENG 1111, Freshman English 2; MTH 1125, Calculus 3; and one sub-area or general elective.
Quarter 4	COM 1130, Computer Organization and Design; MTH 1223, Calculus 4; PHY 1221, Physics 1; PHY 1521, Physics 1 Lab; and one sub-area or general elective.
Quarter 5	COM 1204, Object-Oriented Design; ECE 1178, Digital Electronics for Computer Science; PHY 1222, Physics 2; PHY 1522, Physics 2 Lab; and MTH 1240, Chaos and Fractals.
Quarter 6	COM 1350, Automata and Formal Language; MTH 1387, Probability; and two sub-area or general electives.
Quarter 7	COM 1330, Operating Systems Concepts; ECE 1229, Digital Systems Lab; ECE 1382, Computer Engineering 2; PHY 1223, Physics 3; and one sub-area or general elective.

	Quarter 8	COM 1102, Functional Programming and Applications; ENG 1125, Technical Writing 1; one sub-area or general elective; and one computer science elective.
	Quarter 9	MTH 1301, Linear Algebra; two computer science electives; and one sub-area or general elective.
	Quarter 10	COM 1205, Software Design and Development; COM 1390, Algorithms; SOC 1485, Computers and Society; and one sub-area or general elective.
	Quarter 11	COM 1621, Senior Seminar; two computer science electives; and two sub-area or general electives.
Five-Year Bachelor of Arts Curriculum (with computer science courses beginning in the first year)	Quarter 1	COM 1100, Fundamentals of Computer Science; COM 1121, Computer Science Overview 1; ENG 1110, Freshman English 1; MTH 1123, Calculus 1; and one arts and sciences core course.
	Quarter 2	COM 1101, Algorithms and Data Structures 1; COM 1122, Computer Science Overview 2; MTH 1124, Calculus 2; MTH 1137, Discrete Mathematics 1; and one arts and sciences core course.
	Quarter 3	COM 1201, Algorithms and Data Structures 2; ENG 1111, Freshman English 2; MTH 1125, Calculus 3; and one general elective.
	Quarter 4	COM 1130, Computer Organization and Design; one general elective; one science elective; and one arts and sciences core course.
	Quarter 5	COM 1102, Functional Programming and Applications; COM 1350, Automata and Formal Languages; MTH 1240, Chaos and Fractals; and one science elective.
	Quarter 6	COM 1390, Algorithms; one general elective; one science elective; and one arts and sciences core course.
	Quarter 7	COM 1358, Analysis of Programming Languages; ENG ____, middler-year writing requirement; and two arts and sciences core courses.
	Quarter 8	MTH 1301, Linear Algebra 1; SOC 1485, Computers and Society; one computer science elective; and one arts and sciences core course.
	Quarter 9	One computer science elective; one general elective; and two arts and sciences core courses.
	Quarter 10	One computer science elective; two general electives; and one arts and sciences core course.
	Quarter 11	COM 1621, Computer Science Seminar; one computer science elective; two general electives; and one arts and sciences core course.
Five-Year Bachelor of Arts Curriculum (with computer science courses beginning in the second year)	Quarter 1	ENG 1110, Freshman English 1; MTH 1123, Calculus 1; one science elective; and one arts and sciences core course.
	Quarter 2	MTH 1124, Calculus 2; one general elective; one science elective; and one arts and sciences core course.
	Quarter 3	ENG 1111, Freshman English 2; MTH 1125, Calculus 3; one general elective; and one science elective.
	Quarter 4	COM 1100, Fundamentals of Computer Science; COM 1121, Computer Science Overview 1; MTH 1137, Discrete Mathematics 1; and two arts and sciences core courses.
	Quarter 5	COM 1101, Algorithms and Data Structures 1; COM 1122, Computer Science Overview 2; MTH 1240, Chaos and Fractals; and two arts and sciences core courses.
	Quarter 6	COM 1201, Algorithms and Data Structures 2; COM 1130, Computer Organization and Design; one general elective; and one arts and sciences core course.
	Quarter 7	COM 1102, Functional Programming and Applications; COM 1350, Automata and Formal Language; ENG ____, middler-year writing requirement; and one arts and sciences core course.
	Quarter 8	COM 1390, Algorithms; MTH 1301, Linear Algebra; SOC 1485, Computers and Society; and one general elective.
	Quarter 9	COM 1358, Analysis of Programming Languages; one computer science elective; one general elective; and one arts and sciences core course.

Four-Year Bachelor of Arts Curriculum

Quarter 10	Two computer science electives; one general elective; and one arts and sciences core course.
Quarter 11	COM 1621, Computer Science Seminar; one computer science elective; two general electives; and one arts and sciences core course.
Quarter 1	COM 1100, Fundamentals of Computer Science; COM 1121, Computer Science Overview 1; ENG 1110, Freshman English 1; MTH 1123, Calculus 1; and one arts and sciences core course.
Quarter 2	COM 1101, Algorithms and Data Structure 1; COM 1122, Computer Science Overview 2; MTH 1124, Calculus 2; MTH 1137, Discrete Mathematics 1; and one arts and sciences core course.
Quarter 3	COM 1201, Algorithms and Data Structure 2; ENG 1111, Freshman English 2; MTH 1125, Calculus 3; and one general elective.
Quarter 4	COM 1130, Computer Organization and Design; one science course; and two arts and sciences core courses.
Quarter 5	COM 1102, Functional Programming and Applications; COM 1350, Automata and Formal Languages; MTH 1240, Chaos and Fractals; and one science course.
Quarter 6	COM 1358, Analysis of Programming Languages; one general elective; and two arts and sciences core courses.
Quarter 7	COM 1390, Algorithms; MTH 1301, Linear Algebra; SOC 1485, Computers and Society; and one science course.
Quarter 8	ENG ____, middler-year writing requirement; one computer science elective; one general elective; and one arts and sciences core course.
Quarter 9	One computer science elective; one general elective; and two arts and sciences core courses.
Quarter 10	One computer science elective; two general electives; and one arts and sciences core course.
Quarter 11	COM 1621, Computer Science Seminar; one computer science elective; two general electives; and one arts and sciences core course.

College of Criminal Justice

James Alan Fox, PhD, *Dean*

Robert D. Croatti, PhD, *Associate Dean for Academic Operations and Programs*

Lester W. McCullough, Jr., BA, *Assistant Dean for Academic Services*

Robert E. Fuller, MA, *Assistant Dean for Student Administrative Services*

Charlayne Wilson, MEd, *Academic Counselor*

Professors

Edith E. Flynn, PhD

George L. Kelling, PhD

John H. Laub, PhD

Nicole F. Rafter, PhD

Associate Professors

Frank A. Schubert, JD

Wallace W. Sherwood, LLM

Schulman Professor

Harvey Burstein, JD

Assistant Professors

Nanette Graham, PhD

Melanie Myers, PhD

Mary Ann Zager, PhD

The College of Criminal Justice was established in 1967 as one of the first professional schools of its kind. Since its founding, the college has become a leading force in education, research, and policy-making in both the public and private sectors of the criminal justice field.

The college has a unified undergraduate major, leading to a Bachelor of Science degree in criminal justice, which comprehensively covers the field of criminal justice across both the public and private domains. Building on a solid foundation of required courses focusing on law, criminology, administration of justice, and research tools, the curriculum allows students to tailor their elective coursework, in such areas as homicide, terrorism, victims, juvenile justice, security, courts, and corrections, to suit their own professional interests. In addition, students take a variety of courses in other parts of the University, in such topic areas as computer science, English, math, history, economics, political science, sociology, and psychology.

The combined five-year academic and cooperative education program allows students to concentrate in one of three areas: policing and security, legal studies, and criminology and corrections. Students may also elect not to specialize, but instead to span the broadest possible coverage of the field.

In the policing and security emphasis students learn firsthand the latest developments in policing in the United States, such as community policing, and gain an understanding of the field of security from a business rather than a law enforcement perspective.

The legal studies concentration teaches students how to analyze the mechanics of law and the legal process and to examine the historical and philosophical foundations of our legal system. Students who concentrate on legal studies are well-prepared for law school.

In the criminology and corrections concentration students investigate the causes of crime and assess various correctional responses to criminal offending. This program is viewed as a stepping stone to advanced graduate study and to employment in the corrections area.

Co-op provides opportunities in the full range of career settings, including parole or probation offices, law firms, police departments, private security agencies, public or private institutions, social and government agencies, prisons, and planning and evaluation units. These career-oriented experiences help students to better understand the theory and research presented in their classes.

The college maintains close ties to criminal justice agencies in the community, such as the Boston Police Department and the Office of the Attorney General, and hosts the Justice George Lewis Ruffin Society, an organization of minority criminal justice professionals dedicated to expanding minority involvement and leadership in the criminal justice system. In addition, the college cooperates with the mayor's office and a number of private corporations in helping to run various community-based anti-crime programs. The college faculty also has a strong voice and participates actively in research and policy-making at a national and international level. Besides a variety of major research projects, the college houses the *Journal of Quantitative Criminology*, a leading international journal of research in criminology and criminal justice.

Class Entrance Requirements	Students are required to maintain the following overall quality-point averages to advance to the next class rank and to graduate.	
	Sophomore	1.4
	Middler	1.6
	Junior	1.8
	Senior	1.9
	To graduate	2.0
Graduation Requirements	Degree candidates must complete all prescribed work, a total of 176 quarter hours of credit. Students are also urged to meet the requirements of the Department of Cooperative Education.	
Transfer Credit	No student transferring from another college or university is eligible to receive a degree until at least one year of academic work immediately preceding graduation has been completed at Northeastern.	
Bachelor of Science Curriculum	Quarter 1	CJ 1101, Administration of Criminal Justice; HST 1101, Western Civilization to 1648; POL 1110, Introduction to Politics; and PSY 1111, Foundations of Psychology 1.
	Quarter 2	CJ 1112, Critical Issues in Criminal Justice; COM 1105, Computer Science and Its Applications; ENG 1110, Freshman English 1; and HST 1102, Western Civilization Since 1648.
	Quarter 3	CJ 1151, Introduction to Law and Legal Process 1; ENG 1111, Freshman English 2; PSY 1112, Foundations of Psychology 2; and SOC 1100, Introduction to Sociology.
	Quarter 4	CJ 1201, Criminology; CJ 1251, Introduction to Criminal Law; POL 1111, Introduction to American Government; and one math/science requirement.
	Quarter 5	CJ 1252, Criminal Due Process; POL 1318, State and Local Government; one math/science requirement; and one non-criminal justice elective.
	Quarter 6	CJ 1453, Criminal Justice Research Methods; ECN 1115, Principles of Macroeconomics; ENG 1350, Intermediate Writing; and one criminal justice elective.
	Quarter 7	CJ 1454, Criminal Justice Statistics; ECN 1116, Principles of Microeconomics; one criminal justice elective; and one non-criminal justice elective.
	Quarters 8–11	28 quarter hours of criminal justice electives and 36 quarter hours of non-criminal justice electives.

College of Engineering

Paul H. King, PhD, *Dean*

Yaman Yener, PhD, *Associate Dean and Director, Graduate School of Engineering*

Richard J. Scranton, SM, *Associate Dean for Undergraduate Programs*

C. W. P. Finn, PhD, *Director of the School of Engineering Technology*

Cynthia Snow, MA, *Assistant Dean for Administration*

David C. Blackman, MS, *Assistant Dean and Director of Minority Affairs*

Paula G. Leventman, PhD, *Assistant Dean and Director of Women in Engineering*

Candace A. Martel, MEd, *Director of Engineering Student Services*

The College of Engineering prepares students to contribute to the accumulation and application of technical knowledge. The college aims to help students master the fundamental mathematical and scientific principles underlying a particular branch of engineering; develop and demonstrate competence in analysis and design appropriate to an engineering specialization; reason clearly and communicate effectively; and recognize the need to continue professional development.

Through laboratory exercises, senior design projects, professional association activities, and cooperative work assignments, students put theory into practice and clarify their professional goals.

The college offers a Bachelor of Science degree with specializations in chemical, civil and environmental, electrical and computer, industrial, and mechanical engineering. Although most students choose to complete the Bachelor of Science degree program in five years including seven quarters of cooperative education experience, four-year options without co-op work or with four quarters of work are also available. Students indicate their preference for the four-year option in the winter quarter of the freshman year.

The college also offers a general engineering program leading to a Bachelor of Science degree without specialization; this option is appropriate for students who want a strong technical base for advanced study in such fields as law, medicine, or business. A program of study for this option is arranged on an individual basis with a faculty adviser. A set of courses related to biomedical engineering is also available.

The college encourages students to study the social sciences and humanities, for they provide an awareness of the social, economic, political, aesthetic, and philosophical influences that shape the world in which graduates will practice their professions.

In addition to a full array of University services, special advising and other support services (including tutoring) are provided. Students may qualify to participate in honors sections of many courses. Active student chapters of many national professional engineering organizations and honor societies are supported by the college as an enriching addition to academic studies and co-op experience.

All Bachelor of Science degree programs with specification in an engineering discipline are accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (EAC/ABET). Part-time evening programs are also accredited.

The departments of electrical and computer engineering and mechanical, industrial, and manufacturing engineering offer programs leading to both the bachelor's and master's degrees in five years. Degree candidates must maintain a 3.2 cumulative quality-point average, carry extra courses, and forego one cooperative work quarter in the senior year to complete the course requirements.

Academic standards are published in the *College of Engineering Student Guide*, available at 220 Snell Engineering Center.

The college reserves the right to amend programs, courses, and degree requirements to fulfill its educational responsibility to respond to relevant changes in the field.

Students must complete all of the requirements in the degree program in which they are candidates. Degree requirements are based upon the year of graduation, determined by the date of entry or re-entry into the College of Engineering. Degree requirements and the year of graduation for a degree candidate who fails to make normal academic progress for more than two quarters will be subject to review and possible change.

Students transferring from another college or university must complete at least 48 quarter hours at Northeastern University immediately preceding graduation to be eligible to receive the Bachelor of Science degree.

**Bachelor of Science/
Master of Science
Joint Degree Program**

**Class Entrance
Requirements**

Graduation Requirements

Bachelor of Science Curriculum for First Three Quarters

Students in full-time engineering degree programs take the following courses in the first three quarters.

Quarter 1	ENG 1110, Freshman English 1; GE 1101, Engineering Problem Solving and Computation; MTH 1123, Calculus 1; PHY 1221, Physics 1; and PHY 1521, Physics Lab 1.
Quarter 2	CHM 1131, General Chemistry 1; ENG 1111, Freshman English 2; GE 1102, Engineering Problem Solving with Application Software; MTH 1124, Calculus 2; and PHY 1222, Physics 2.
Quarter 3	CHM 1132, General Chemistry 2; GE 1103, Engineering Design; MTH 1125, Calculus 3; PHY 1223, Physics 3; and PHY 1523, Physics Lab 2.

Biomedical Engineering

Samuel Finé, SM, MD, *Professor and Director*

Biomedical engineers work on both theoretical and practical problems of biological and medical significance. They may study the mechanism of action of natural and synthetic macromolecules, analyze the properties of blood, or investigate the structure and function of human organ systems.

A program incorporating engineering and the biological sciences can provide a sound foundation for a doctorate in medicine or dentistry, for a career in research, public health, biomedical engineering, or biotechnology, or for work as an engineer in a hospital or government agency.

The health-care, pharmaceutical, and biotechnology industries, in particular, seek individuals with a strong background in engineering supplemented by biological science education. Other career opportunities may include public health, the psychological sciences, and the marine sciences.

The biomedical engineering option has no fixed curriculum. Students work with an adviser to choose courses in the biological sciences that complement the standard engineering curriculum.

Chemical Engineering

Ralph A. Buonopane, PhD, *Associate Professor and Chair*

Professors

Ronald J. Willey, PhD

John A. Williams, PhD

Donald L. Wise, PhD,

Cabot Corporation

Professor of

Chemical Engineering

Associate Professors

Gilda A. Barabino, PhD

Bernard M. Goodwin, ScD

Richard R. Stewart, PhD

The goal of the chemical engineering program is to offer students a broad education that stresses the fundamentals of science, technology, and engineering and incorporates state-of-the-art computer-aided design and management of production processes. An undergraduate degree in chemical engineering provides a solid background for graduate study or practice in the many diverse areas of chemical engineering found in industry.

Chemical engineers are creative problem-solvers whose work touches all our lives. They are involved in creating new products such as wonder drugs, materials that improve life on earth, and systems that make space exploration a reality.

Petrochemicals, biomedicines, pharmaceuticals, agricultural chemicals, plastics, fibers, and synthetic fuels are among the materials of the modern world that are the results of chemical engineering. Chemical engineers work on ways to reduce acid rain and smog, to recycle and reduce wastes, to develop new sources of environmentally clean energy, and to use existing resources safely and efficiently. Chemical engineers not only develop new products, but also seek ways to reduce costs, increase production, and improve the quality of existing products.

Cooperative education and career opportunities for chemical engineering students are found in companies working with all of these technologies that touch our lives. As students gain more knowledge through co-op and academic work, cooperative education assignments increase in responsibility and challenge towards fully professional levels.

Bachelor of Science Curriculum

Quarters 1-3	See above. (In Quarter 3 replace PHY 1523 with CHM 1138, General Chemistry Lab.)
Quarter 4	CHE 1201, Chemical Engineering Calculations 1; CHE 1205, Computation Lab; CHM 1271, Organic Chemistry 1; MTH 1223, Calculus 4; and one social science/humanities elective.

Quarter 5	CHE 1202, Chemical Engineering Calculations 2; CHM 1272, Organic Chemistry 2 with Lab; MTH 1225, Differential Equations (Engineering) 1; and one social science/humanities elective.
Quarter 6	CHE 1211, Chemical Engineering Thermodynamics 1; CHM 1381, Physical Chemistry 1; CHM 1394, Experimental Physical Chemistry 1; MTH 1230, Linear Algebra; and one social science/humanities elective.
Quarter 7	CHE 1310, Chemical Engineering Thermodynamics 2; CHE 1321, Momentum Transport; CHM 1382, Physical Chemistry 2; CHM 1395, Experimental Physical Chemistry 2; and ENG 1125, Technical Writing.
Quarter 8	CHE 1415, Experimental Methods 1; CHE 1421, Chemical Engineering Kinetics; CHE 1431, Heat Transport; and ECN 1115, Principles of Macroeconomics.
Quarter 9	CHE 1416, Experimental Methods 2; CHE 1441, Separation Processes; CHE 1450, Chemical Engineering Economics; and one social science/humanities elective.
Quarter 10	CHE 1501, Process Design 1; CHE 1512, Chemical Process Control; one chemical engineering elective; and one engineering elective.
Quarter 11 (Spring only)	CHE 1502, Process Design 2; two chemical engineering electives; and one advanced chemistry elective.

Civil and Environmental Engineering

Mishac K. Yegian, PhD, *Professor and Chair*

Professors

Frederic C. Blanc, PhD
John J. Cochrane, PhD
Constantine J. Gregory, PhD
Paul H. King, PhD

Associate Professors

Dionisio Bernal, PhD
Peter G. Furth, PhD
Richard J. Scranton, SM
Ali Touran, PhD
Irvine W. Wei, PhD

Assistant Professors

Fernando R.
Miralles-Wilhelm, PhD
Ajiboye F. Oluokun, PhD
Thomas C. Sheahan, ScD
Sara Wadia-Fascetti, PhD

Adjunct Professor

Sidney J. Wartel, JD

Professor Emeritus

Kenneth M. Leet, ScD

Civil engineers judiciously apply their knowledge of mathematics and physical sciences to improve and protect the environment and to provide facilities and structures for community living, industry, and transportation. Civil engineering encompasses several disciplines, including structural engineering, environmental engineering, transportation planning and engineering, and geotechnical engineering. Civil engineers supervise the construction of bridges, tunnels, buildings, dams, and aqueducts. Civil engineers plan, design, construct, and manage highways, railroads, canals, and airports; regulate rivers and control floods; design and build systems for water distribution, wastewater treatment, refuse disposal, and environmental remediation.

The civil engineering program offers a fundamental and rigorous yet flexible engineering education—an education that will weather inevitable changes within the field. The curriculum is intended to provide students with a solid background for careers in planning, design, construction, and engineering management. Students acquire a common base of knowledge in the engineering sciences, including structural mechanics, fluid mechanics, and environmental science. In more advanced courses, students learn to analyze and design structural systems (such as building frames and bridges), water and wastewater treatment systems, highways and mass transit systems, hydraulic systems, earth dams, and building foundations. Students use some of their electives to concentrate in one of four areas: structural, environmental, geotechnical, or transportation engineering.

In addition to the basic program in civil engineering, the department offers an option in environmental engineering. This option allows students who wish to specialize in environmental engineering to gain a stronger background in related environmental sciences.

Students also study the background within which they will practice engineering through a variety of courses in the social sciences and humanities, as well as specific courses dealing with law, professional ethics, and engineering management.

The co-op program parallels the academic program in level of responsibility and sophistication. A beginning job might involve layout at a construction site or laboratory testing; in senior level co-op assignments, students are often working alongside engineers on design teams.

**Bachelor of Science in
Civil Engineering
Curriculum**

Quarters 1–3	See page 99.
Quarter 4	CIV 1210, Structural Mechanics 1; CIV 1510, Materials; CIV 1511, Materials Lab; MTH 1223, Calculus 4; and one social science/humanities elective.
Quarter 5	CIV 1211, Structural Mechanics 2; CIV 1620, Engineering Measurements; CIV 1621, Engineering Measurements Lab; ECN 1116, Principles of Microeconomics; and MTH 1225, Differential Equations (Engineering) 1.
Quarter 6	CIV 1220, Structural Analysis 1; CIV 1226, Structural Analysis and Design Lab; CIV 1310, Fluid Mechanics; MTH 1230, Linear Algebra; and one social science/humanities elective.
Quarter 7	CIV 1240, Concrete Design 1; CIV 1340, Environmental Engineering 1; CIV 1410, Soil Mechanics; CIV 1411, Soil Mechanics Lab; and ENG 1125, Technical Writing.
Quarter 8	CIV 1250, Steel Design 1; ME 1320, Dynamics for Civil Engineers; and two technical electives.
Quarter 9	CIV 1665, Professional Issues for Civil Engineers; IIS 1366, Engineering Economy; CIV 1640, Applied Probability Theory for Civil Engineers; and two technical electives.
Quarter 10	Two technical electives; one social science/humanities elective; and one general elective.
Quarter 11	One capstone elective; two technical electives; and one social science/humanities elective.

**Environmental
Engineering Option
Curriculum**

Quarters 1–3	See page 99.
Quarter 4	CIV 1210, Structural Mechanics 1; CIV 1510, Materials; CIV 1511, Materials Lab; MTH 1223, Calculus 4; and one social science/humanities elective.
Quarter 5	CIV 1211, Structural Mechanics 2; CIV 1620, Engineering Measurements; CIV 1621, Engineering Measurements Lab; ECN 1116, Principles of Microeconomics; and MTH 1225, Differential Equations (Engineering) 1.
Quarter 6	CIV 1220, Structural Analysis 1; CIV 1226, Structural Analysis and Design Lab; CIV 1310, Fluid Mechanics; MTH 1230, Linear Algebra; and one social science/humanities elective.
Quarter 7	CIV 1240, Concrete Design 1; CIV 1340, Environmental Engineering 1; CIV 1410, Soil Mechanics; CIV 1411, Soil Mechanics Lab; and ENG 1125, Technical Writing.
Quarter 8	One engineering breadth elective; one environmental science elective; and two technical electives.
Quarter 9	CIV 1665, Professional Issues for Civil Engineers; IIS 1366, Engineering Economy; CIV 1640, Applied Probability Theory for Civil Engineers; CIV 1341, Environmental Engineering 2; and CIV 1320, Hydraulic Engineering.
Quarter 10	CIV 1350, Environmental and Hydraulics Lab; one environmental science elective; one social science/humanities elective; and one general elective.
Quarter 11	CIV 1395, Environmental Design Projects; two technical electives; and one social science/humanities elective.

Electrical and Computer Engineering

John G. Proakis, PhD, *William Lincoln Smith Professor and Chair*

Professors

Soeren Buus, PhD
 Chung Chan, PhD
 Anthony J. Devaney, PhD
 James M. Feldman, PhD
 Samuel Fine, SM, MD
 Arvin Grabel, ScD
 Sarma S. Mulukutla, PhD
 Sheila Prasad-Hinchey, PhD
 Sheldon S. Sandler, PhD
 Martin E. Schetzen, ScD
 Philip E. Serafim, ScD
 Michael B. Silevitch, PhD
 Carmine Vittoria, PhD

Associate Professors

David Brady, PhD
 Jill D. Crisman, PhD
 Vinay Ingle, PhD
 Wayne G. Kellner, ScD
 Mieczyslaw M. Kokar, PhD
 Miriam Lesser, PhD
 Hanoch Lev-Ari, PhD
 Elias S. Manolakos, PhD
 Nicol E. McGruer, PhD
 Stephen W. McKnight, PhD
 David J. McLaughlin, PhD
 Ramachandran Raghavan, PhD
 Carey M. Rappaport, ScD
 Masoud Salehi, PhD
 Bahram Shafai, ScD
 Ioannis Stavrakakis, PhD
 Gilead Tadmor, PhD
 Man-Kuan Vai, PhD
 Paul M. Zavracky, PhD

Assistant Professors

Dana Brooks, PhD
 Lisa Dron, PhD
 Jeffrey A. Hopwood, PhD
 David R. Kaeli, PhD
 Bradley Lehman, PhD
 Eric Miller, PhD
 Sampath Rangarajan, PhD
 Aleksandar M. Stankovic, PhD

Lecturers

Jack I. Hanania, PhD
 Jacob Shekel, DSc

In electrical and computer engineering, students gain the knowledge and skills to address such problems as transferring and managing information, improving industrial productivity, conserving energy, and finding alternative energy sources. Electrical engineers have had a primary role in the development of the computer, integrated circuits, the pacemaker, satellite communication, space navigation, microprocessors, television, and the means of providing energy.

Some electrical engineers work in traditional areas of system design and development; others apply their skills in areas as diverse as ocean exploration, meteorology, transportation, experimental psychology, electronic music, health care systems, bioelectronics, and the development of educational devices for individuals with special needs.

The curriculum incorporates both information sciences, which focus on systems whose function is computation, communication, or control, and energy resources, which focus on the sources, generation, and distribution of large quantities of electrical energy.

The academic program is supported by extensive laboratory facilities for study and experimentation in computing, circuit analysis, electronics, digital systems, microwaves, control systems, semiconductor processing, VLSI design, digital signal processing, and power and energy conversion.

In addition to electrical engineering, the department offers options in computer engineering and power systems engineering. All options are based on a common core program, with a special concentration during the last two years of study. The computer engineering option allows specialization in designing and integrating digital computers within larger systems for communications, resource management, and automatic control. The power systems engineering option is conducted in cooperation with electric power companies in New England and other eastern states and allows students to specialize in energy resources.

In the cooperative work phase of the program, co-op jobs generally increase in the level of responsibility as students gain theoretical and technical knowledge through their academic work. A sophomore might begin cooperative work experience as an engineering assistant and progress by the senior year to a position with responsibilities similar to entry-level engineers.

For those who wish to specialize in designing and integrating digital computers within larger systems for communications, resource management, and automatic control, this option offers a basic but comprehensive knowledge of the principles underlying the organization, design, and applications of digital processing systems. Both hardware and software design are covered.

This option is designed for students who wish to specialize in energy resources. The program is conducted in cooperation with electric power companies in New England and several eastern states.

Option in Computer Engineering

Option in Power Systems Engineering

Bachelor of Science in Electrical Engineering Curriculum

Quarters 1-3 See page 99.

Quarter 4 ECE 1240, Introduction to Electrical Engineering Lab; ECE 1381, Computer Engineering 1; MTH 1225, Differential Equations (Engineering); PHY 1224, Physics 4; and one social science/humanities elective.

Quarter 5	ECE 1215, Circuits 1 and ECE 1241, Circuits Lab; ME 1386, Materials Science; MTH 1223, Calculus 4; and one social science/humanities elective.
Quarter 6	ECE 1246, Circuits 2; ECE 1341, Electronics 1 and ECE 1242, Electronics Lab 1; ECE 1382, Computer Engineering 2 and ECE 1229, Digital Systems Lab; and ECE 1363, Electromagnetic Field Theory 1.
Quarter 7	ECE 1332, Linear Systems 1; ECE 1342, Electronics 2 and ECE 1243, Electronics Lab 2; ECE 1364, Electromagnetic Field Theory 2 and ECE 1227, Fields Lab; and ENG 1125, Technical Writing.
Quarter 8	ECE 1333, Linear Systems 2 and ECE 1226, Discrete Systems Lab; ME 1340, Thermodynamics or ME 1321, Mechanics; MTH 1384, Probability; and one technical elective (level 1).
Quarter 9	ECE 1355, Communication Systems 1; two technical electives (level 1); and one social science/humanities elective.
Quarter 10	ECE 1501, Capstone Design 1; two technical electives (level 1 or level 2); one technical elective (level 2); and one social science/humanities elective.
Quarter 11	ECE 1502, Capstone Design 2; two technical electives (level 2); and one social science/humanities elective.
Bachelor of Science in Electrical Engineering Computer Engineering Option Curriculum	
Quarters 1–3	See page 99.
Quarters 4–7	Same as electrical engineering.
Quarter 8	ECE 1333, Linear Systems 2 and ECE 1226, Discrete Systems Lab; ECE 1383, Computer Engineering 3; ME 1340, Thermodynamics or ME 1321, Mechanics; and MTH 1384, Probability.
Quarter 9	ECE 1351, Topics in IC Design and ECE 1230, VLSI Design Lab; ECE 1355, Communication Systems 1; one technical elective (level 1); and one social science/humanities elective.
Quarter 10	ECE 1384, Computer Engineering 4; ECE 1501, Capstone Design 1; one technical elective (level 1); one technical elective (level 1 or 2); and one social science/humanities elective.
Quarter 11	ECE 1502, Capstone Design 2; one technical elective (level 1 or 2); one technical elective (level 2); and one social science/humanities elective.
Bachelor of Science in Electrical Engineering Power Systems Engineering Option Curriculum	
Quarters 1–3	See page 99.
Quarters 4–7	Same as electrical engineering.
Quarter 8	ECE 1333, Linear Systems 2 and ECE 1226, Discrete Systems Lab; ECE 1370, Electric Energy Devices and ECE 1228, Energy Devices Lab; ME 1340, Thermodynamics or ME 1321, Mechanics; and MTH 1384, Probability.
Quarter 9 (Spring only)	ECE 1355, Communication Systems 1; ECE 1371, Electric Drives and Motion Systems and ECE 1232, Electric Machines Lab; ECE 1471, Elements of Power Systems; and one social science/humanities elective.
Quarter 10 (Winter only)	ECE 1472, Power Systems Analysis and ECE 1231, Power Systems Lab; ECE 1501, Capstone Design 1; one technical elective (level 1); one technical elective (level 1 or 2); and one social science/humanities elective.
Quarter 11 (Spring only)	ECE 1379, Analysis of Electrical Transients; ECE 1474, Power Electronics; ECE 1502, Capstone Design 2; and one social science/humanities elective.

General Engineering

Advisory Committee

Richard R. Stewart, PhD, *Chemical Engineering, Chair*
 Peter Furth, PhD, *Civil and Environmental Engineering*
 Arvin Grabel, ScD, *Electrical Engineering*
 Ronald F. Perry, PhD, *Industrial Engineering*
 Mohamad Metghalchi, ScD, *Mechanical Engineering*

The goal of the general engineering program is to provide students with flexible, interdisciplinary opportunities to study basic engineering concepts plus courses in areas related to their interests, such as business or science.

This program is designed for students interested in engineering-related professions rather than a specific engineering discipline. It is highly elective and enables students to tailor their studies to meet their particular objectives. A general engineering background offers the foundation for advanced study in such areas as medicine, law, or business, particularly for those interested in the more technical aspects or applications of those professions. Students who complete an adviser-approved program receive an unspecified Bachelor of Science degree from the College of Engineering.

Bachelor of Science Curriculum

Quarters 1–3	See page 99. (Replace CHM 1131 and CHM 1132 with social science/humanities electives.)
Quarter 4	MTH 1223, Calculus 4; one basic science elective; one engineering science elective; and one social science/humanities elective.
Quarter 5	MTH 1225, Differential Equations (Engineering) 1; one engineering science elective; one coordinated study elective; and one social science/humanities elective.
Quarter 6	ENG 1340, Writing Workshop I; one engineering science elective; two coordinated study electives; and one social science/humanities elective.
Quarter 7	Two engineering science electives; one coordinated study elective; and one social science/humanities elective.
Quarter 8	Two engineering science electives and two coordinated study electives.
Quarter 9	Two engineering science electives and two coordinated study electives.
Quarter 10	Two engineering science electives and two coordinated study electives.
Quarter 11	One engineering science elective and three coordinated study electives.

Mechanical, Industrial, and Manufacturing Engineering

John W. Cipolla, Jr., PhD, *Donald W. Smith Professor of Engineering and Chair*

Professors

George G. Adams, PhD
Thomas P. Cullinane, PhD
Stuart J. Deutsch, PhD
Alexander M. Gorlov, PhD
Ronald R. Mourant, PhD
Richard J. Murphy, PhD
Hamid Nayeib-Hashemi, PhD
John N. Rossettos, PhD
Mohammad E. Taslim, PhD
Yaman Yener, PhD
Ibrahim Zeid, PhD

Associate Professors

Nasser Fard, PhD
Surendra M. Gupta, PhD
Olusegun J. Ilegbusi, PhD
Gregory J. Kowalski, PhD
Mieczyslaw M. Kokar, PhD
Yiannis A. Levendis, PhD
Emanuel S. Melachrinoudis, PhD
Achille Messac, PhD
Mohamad Metghalchi, ScD
Uichiro Narusawa, PhD
Ronald F. Perry, PhD
Gerard Voland, PhD

Assistant Professors

Mary E. Helander, PhD
Jacqueline A. Isaacs, PhD
Sagar V. Kamarthi, PhD
Charles S. White, PhD
Mary Grace Williams, PhD
Bruce Wilson, PhD

Professors Emeriti

Charles A. Berg, ScD
Ralph S. Blanchard, MS
Arthur R. Foster, MEng
Thomas E. Hulbert, MS
Bertram S. Long, MEng
Alvin J. Yorra, MS
John Zotos, MEng

Senior Research Engineer

Joseph T. Blucher, PhD

The Department of Mechanical, Industrial, and Manufacturing Engineering offers two accredited programs leading to a Bachelor of Science in Industrial Engineering and a Bachelor of Science in Mechanical Engineering.

Industrial Engineering

Industrial engineering involves the design and analysis of systems that include people, equipment, and materials and their interactions and performance in the workplace. The industrial engineer collects this information and evaluates alternatives to make decisions that best advance the goals of the enterprise.

The program in industrial engineering offers students a base of traditional engineering courses such as production systems, work design, probability, statistics, and engineering economy, while emphasizing such contemporary areas as simulation, material handling, computer software, quality control, and operations research.

To gain the skills they need to make informed managerial and professional decisions, students take courses in management, economics, and technical subjects, as well as in the humanities and social sciences.

Industrial engineers work in manufacturing firms, hospitals, banks, public utilities, government agencies, insurance companies, and construction firms. Among the projects they undertake are design and implementation of a computer-integrated manufacturing system, design of a robotics system in a manufacturing environment, long-range corporate planning, development and implementation of a quality-control system, design of workstations to enhance worker safety and productivity, and development of computer systems for information control.

Co-op jobs generally increase in level of responsibility as students gain theoretical and technical knowledge through their academic work. A sophomore might begin as a computer analyst evaluating the performance of a manufacturing system and progress to designing manufacturing engineering workstations by the senior year.

Bachelor of Science Curriculum

Quarters 1–3	See page 99.
Quarter 4	ECN 1115, Principles of Macroeconomics; IIS 1200, Work Design; MTH 1223, Calculus 4; and one behavioral science, social science, or humanities elective.
Quarter 5	ECN 1116, Principles of Microeconomics; IIS 1330, Computation and Programming 1; ME 1201, Statics; and MTH 1225, Differential Equations (Engineering) 1.
Quarter 6	ECE 1171, Electrical Engineering 1; IIS 1300, Probabilistic Analysis for Engineers; and MTH 1230, Linear Algebra; and one engineering science elective.
Quarter 7	IIS 1360, Engineering Economy; one technical elective; one behavioral science, social science, or humanities elective; and one open elective.
Quarter 8	IIS 1310, Statistics; IIS 1340, Operations Research 1; IIS 1475, Human-Machine Systems; and HRM 1432, Organizational Behavior.
Quarter 9	IIS 1341, Operations Research 2; IIS 1350, Digital Simulation Techniques; ENG 1125, Technical Writing; one engineering science elective; and one behavioral science, social science, or humanities elective.
Quarter 10	IIS 1405, Production and Inventory Control; IIS 1436, Quality Assurance; and two technical electives.
Quarter 11	IIS 1401, Design Project; two IIS technical electives; and one behavioral science, social science, or humanities elective.

Mechanical Engineering

Mechanical engineering involves the design, development and manufacture of machinery and devices to transmit power or to convert energy from thermal to mechanical form in order to power the modern world and its machines. Its current practice has been heavily influenced by recent advances in computer hardware and software.

Mechanical engineers use computers to formulate preliminary and final designs of systems or devices, to perform calculations that predict the behavior of the design, and to collect and analyze performance data from system testing or operation.

Traditionally, mechanical engineers have designed and tested such devices as heating and air-conditioning systems, machine tools, internal combustion engines, and steam power plants. Today they also play primary roles in the development of new technologies in a variety of fields—energy conversion, solar energy utilization, environmental control, prosthetics, transportation, manufacturing, and new materials development.

The curriculum in mechanical engineering focuses on three areas: applied mechanics, thermofluids engineering, and materials science. Applied mechanics is the study of the motion and deformation of the structural elements acted on by forces in devices that range from rotating industrial dynamos to dentists' drills. Thermofluids engineering deals with the motion of fluids and the transfer of energy, as in the cooling of electronic components or the design of gas turbine engines. Materials science is concerned with the relationship between the structure and properties of materials and with the control of structure, through processing, to achieve the desired properties. Practical applications are in the development of composite materials and in metallurgical process industries.

Courses in each area form the foundation for advanced analytical and creative design courses that culminate in a two-quarter senior design project. Faculty encourage students throughout the curriculum to use computer-aided design tools and high-performance computer workstations.

Cooperative education assignments increase in responsibility and technical challenge as students progress through the program. Initial positions may involve computer intensive CAD/CAM assignments or programming tasks, while more advanced jobs will place students in charge of quality control systems and performance testing of equipment.

**Bachelor of Science
Curriculum**

Quarters 1-3	See page 99.
Quarter 4	ECN 1115, Principles of Macroeconomics or ECN 1116, Principles of Microeconomics; ME 1201, Statics; ME 1360, Thermodynamics 1; and MTH 1223, Calculus 4.
Quarter 5	ME 1392, Measurement and Analysis; ME 1202, Dynamics 1; ME 1361, Thermodynamics 2; and MTH 1225, Differential Equations (Engineering) 1.
Quarter 6	ENG 1340, Writing Workshop; ME 1203, Strength of Materials 1; ME 1315, Dynamics 2; ME 1375, Fluid Mechanics 1; and MTH 1226, Differential Equations (Engineering) 2.
Quarter 7	ME 1314, Strength of Materials 2; ME 1365, Heat Transfer; MTH 1230, Linear Algebra; and ME 1380, Materials Science.
Quarter 8	ME 1335, Mechanical Design; ME 1362, Thermodynamics 3; ME 1480, Mechanical Behavior of Materials; or ECE 1171, Electrical Engineering; and one social science/humanities elective.
Quarter 9	ME 1337, Thermal Design; ME 1415, Mechanical Vibrations; ME 1483, Materials Processing or ECE 1171, Electrical Engineering; and one social science/humanities elective.
Quarter 10	ME 1336, Design Project 1; two technical electives*; and one social science/humanities elective.
Quarter 11	ME 1338, Design Project 2; two technical electives*; and one social science/humanities elective.

*An approved physics/science elective must be taken in either quarter 10 or quarter 11.

**Part-Time Evening
Engineering**

The Part-Time Engineering Program is designed to meet the needs of individuals who must combine full-time work responsibilities with part-time evening study. This six-year, part-time evening curriculum leads to a degree of Bachelor of Science in civil and environmental, electrical, or mechanical engineering. Admissions and course requirements are identical to the full-time, five-year cooperative degree programs. For an application and more information contact 220 Snell, 373-2185. The program coordinator is Caryn Vigoda, MEd.

**Part-Time Evening
Curriculum for
Bachelor of Science**

All programs follow the same curriculum for years one and two.

First Year	Fall Quarter	GE 1101, Problem Solving and Computation and MTH 1123, Calculus 1.
	Winter Quarter	CHM 1131, Chemistry 1; GE 1102, Problem Solving with Application Software; and MTH 1124, Calculus 2.
	Spring Quarter	CHM 1132, Chemistry 2 and MTH 1125, Calculus 3.
	Fall Quarter	MTH 1223, Calculus 4; PHY 1221, Physics 1; and PHY 1521, Physics 1 Lab.
	Winter Quarter	MTH 1225, Differential Equations (Engineering) 1; and PHY 1222, Physics 2.
	Spring Quarter	GE 1103, Engineering Design; PHY 1223, Physics 3; and PHY 1523, Physics 3 Lab.
Second Year	Fall Quarter	CIV 1210, Structural Mechanics 1; and CIV 1620, Engineering Measurements or CIV 1340, Environmental Engineering 1.
	Winter Quarter	CIV 1211, Structural Mechanics 2; MTH 1230, Linear Algebra or CIV 1640, Applied Probability Theory for Civil Engineers.
	Spring Quarter	CIV 1310, Fluid Mechanics; CIV 1410, Soil Mechanics and CIV 1411, Soil Mechanics Lab or CIV 1510, Materials and CIV 1511, Materials Lab.
Third Year	Fall Quarter	CIV 1220, Structural Analysis 1 and CIV 1226, Structural Analysis Lab; and CIV 1340, Environmental Engineering 1 or CIV 1620, Engineering Measurements.
	Winter Quarter	
	Spring Quarter	
Fourth Year	Fall Quarter	
	Winter Quarter	
	Spring Quarter	

**Part-Time Evening
Curriculum for Bachelor
of Science in Civil and
Environmental
Engineering**

		Winter Quarter	CIV 1240, Design of Reinforced Concrete Structures I; MTH 1230, Linear Algebra <i>or</i> CIV 1640, Applied Probability Theory for Civil Engineers.
		Spring Quarter	CIV 1250, Steel Design I; CIV 1510, Materials and CIV 1511, Materials Lab <i>or</i> CIV 1410, Soil Mechanics and CIV 1411, Soil Mechanics Lab.
Environmental Concentration	Fifth and Sixth Years		CIV 1245, Advanced Structure Design; CIV 1320, Hydraulic Engineering; CIV 1341, Environmental Engineering 2; CIV 1350, Environmental/Hydraulic Lab; CIV 1395, Environmental Design Project; CIV 1420, Foundation Engineering; CIV 3636, Transportation Engineering; CIV 3642, Transportation Planning; IIS 1366, Engineering Economy; ME 1320, Dynamics; ME 1340, Thermodynamics; and a general elective.
Structural Concentration	Fifth and Sixth Years		CIV 1222, Structural Analysis 2; CIV 1245, Advanced Structure Design; CIV 1295, Structural Design Project; CIV 1320, Hydraulic Engineering; CIV 1341, Environmental Engineering 2; CIV 1420, Foundation Engineering; CIV 3636 Transportation Engineering; CIV 3642, Transportation Planning; IIS 1366 Engineering Economy; ME 1320, Dynamics; ME 1340, Thermodynamics; and a general elective.
Part-Time Evening Curriculum for Bachelor of Science in Electrical Engineering	Third Year	Summer Quarters	During the summer quarters students are expected to take ENG 1110, Freshman English 1; ENG 1111, Freshman English 2; ECN 1116, Principles of Microeconomics; ENG 1125, Technical Writing; four adviser-approved social science/humanities electives; and CIV 1665, Professional Issues in Civil Engineering.
		Fall Quarter	ECE 1240, Introduction to Electrical Engineering Lab; ECE 1381, Computer Engineering 1; and PHY 1224, Physics 4.
		Winter Quarter	ECE 1215, Circuits 1 and ECE 1241, Circuits Lab; and ME 1386, Materials Science.
	Fourth Year	Spring Quarter	ECE 1246, Circuits 2; ECE 1341, Electronics 1 and ECE 1242, Electronics Lab 1.
		Fall Quarter	ECE 1342, Electronics 2 and ECE 1243, Electronics Lab 2; ECE 1382, Computer Engineering 2 and ECE 1229, Digital Systems Lab.
		Winter Quarter	ECE 1332, Linear Systems 1; and ME 1321, Mechanics <i>or</i> ME 1340, Thermodynamics.
		Spring Quarter	ECE 1333, Linear Systems 2 and ECE 1226, Discrete Systems Lab; and MTH 1384, Probability.
	Fifth Year	Fall Quarter	ECE 1363, Electromagnetic Field Theory 1; and one technical elective (level 1).
		Winter Quarter	ECE 1364, Electromagnetic Field Theory 2 and ECE 1227, Electromagnetic Fields Lab; and one technical elective (level 1).
		Spring Quarter	ECE 1355, Communication Systems 1; and one technical elective (level 1).
	Sixth Year	Fall Quarter	One technical elective (level 1 or 2); and one technical elective (level 2).
		Winter Quarter	ECE 1501, Capstone Design 1; one technical elective (level 1 or 2); and one technical elective (level 2).
		Spring Quarter	ECE 1502, Capstone Design 2; and one technical elective (level 2).
		Summer Quarters	During the summer quarters students are expected to take ENG 1110, Freshman English 1; ENG 1111, Freshman English 2; five adviser-approved social science/humanities electives; and ENG 1125, Technical Writing.

**Computer Engineering
Option**

Required technical electives: ECE 1383, Computer Engineering 3 (level 1); ECE 1384, Computer Engineering 4 (level 2); and ECE 1351, Topics in IC Design and ECE 1230, VLSI Design Lab (level 2).

**Part-Time Evening
Curriculum for Bachelor
of Science in Mechanical
Engineering**

Third Year	Fall Quarter	ME 1201, Statics and PHY 1224, Physics 4.
	Winter Quarter	ME 1392, Measurements and Analysis and MTH 1230, Linear Algebra.
	Spring Quarter	MTH 1226, Mathematical Analysis 2 and ME 1360, Thermodynamics 1.
Fourth Year	Fall Quarter	ME 1203, Strength of Materials 1 and ME 1361, Thermodynamics 2.
	Winter Quarter	ME 1202, Dynamics 1 and ME 1375, Fluid Mechanics.
	Spring Quarter	ME 1314, Strength of Materials 2 and ME 1365, Heat Transfer.
Fifth Year	Fall Quarter	ME 1335, Mechanical Design and ME 1337, Thermal Design.
	Winter Quarter	ME 1336, Design Project 1 and ME 1380, Materials Science.
	Spring Quarter	ME 1338, Design Project 2 and ME 1480, Mechanical Behavior of Materials.
	Summer Quarter	An additional ME technical elective is required in the summer following the fifth year.
Sixth Year	Fall Quarter	ECE 1171, Electrical Engineering 1 and ME 1362, Thermodynamics 3.
	Winter Quarter	ENG 1340, Writing Workshop; ME 1315, Dynamics 2; and one technical elective.
	Spring Quarter	ME 1415, Mechanical Vibrations; and one technical elective.
	Summer Quarters	During the summer quarters students are expected to take ENG 1110, Freshman English 1; ENG 1111, Freshman English 2; ECN 1115, Principles of Macroeconomics or ECN 1116, Principles of Microeconomics; and four adviser-approved social science/humanities electives.

School of Engineering Technology

C. W. P. Finn, PhD, *Director*

Roy Dalsheim, BS, *Assistant Director*

Rasma Galins, *Assistant Director*

Professor

Samuel Fine, MD

*Electrical Engineering
Technology*

Associate Professors

William E. Cole, PhD

*Mechanical Engineering
Technology*

David S. Goldman, MS, PE

Computer Technology

Eric W. Hansberry, MS

Design Graphics

George F. Kent, MS, MBA, PE

*Mechanical Engineering
Technology*

Assistant Professor

John E. Hajjar, PhD

Computer Technology

Associate Academic Specialist

Leonard F. Dow, MS

*Electrical Engineering
Technology*

Lecturer

Jerome Tapper, BS, PE

*Electrical Engineering
Technology*

The programs in the School of Engineering Technology concentrate on the applications of technology and emphasize the rational processes involved in converting theories and ideas into practical techniques, procedures, and products. Fundamentals are related to current practice, providing a supportive "why" for the practical "how." The study of the humanities and social sciences helps students gain a balanced, well-rounded education.

Engineering technologists work with professional engineers, scientists, medical doctors, supervisors, and craftspersons to develop techniques for converting scientific knowledge and craftsmanship into products. The curriculum helps students understand the scientific principles that govern current technology; apply technology to problem solving; communicate effectively the important implications of technological advances; and acquire the motivation for continued development of technical skills.

The school offers five-year cooperative education programs in mechanical engineering technology, electrical engineering technology, and computer technology—all leading to the degree of Bachelor of Science in Engineering Technology. A firm choice of major may be delayed until the spring quarter of the freshman year.

For transfer students, the school offers a three-year Bachelor of Science degree program with a major in aerospace maintenance engineering technology.

The electrical and mechanical engineering technology baccalaureate day programs and the part-time baccalaureate programs in mechanical and electrical engineering technology are accredited by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology (TAC/ABET). The part-time program leading to an Associate of Science in engineering degree with majors in electrical and mechanical engineering technology are also accredited by TAC/ABET.

Part-Time Evening and Weekend Programs

The part-time programs include courses and degree programs leading to the Associate in Engineering (AE), the Associate in Science (AS), and the Bachelor of Science in Engineering Technology (BSET). The AE degree may be earned in computer technology and in environmental, structural, survey and highway, electrical, and mechanical engineering technology. The AS degree may be earned in telecommunications.

Students may also earn the BSET in computer technology, mechanical, electrical, or manufacturing engineering technology. A degree in aerospace maintenance engineering technology is available for transfer students who have completed an airframe and power plant curriculum.

For more information on part-time programs, contact Northeastern University, School of Engineering Technology, 120 Snell Engineering Center, Boston, MA 02115; or call 617-373-2500 (voice), 617-373-8526 (TTY), or 617-373-2501 (FAX).

Class Entrance Requirements

The minimum overall quality-point averages listed are required for students to advance to the next rank and to graduate.

Sophomore	1.6
Middler	1.7
Junior	1.8
Senior	2.0
To graduate	2.0

A cumulative quality-point average of 2.0 or better in major courses is required for graduation. Students are expected to carry the normal prescribed curriculum for the program. Details on criteria for academic probation and suspension are available at 120 Snell Engineering Center.

Graduation Requirement

Students transferring from another college or university are not eligible to receive the degree until they have completed at least one academic year at Northeastern immediately preceding their graduation.

For more information about programs and requirements, refer to the School of Engineering Technology bulletin, available at 120 Snell Engineering Center.

Minor in Computer Technology

To qualify for a minor in computer technology, the student must complete the following six courses and one laboratory. A student does not have to be enrolled in the School of Engineering Technology to declare the minor, but the student must meet the published prerequisites for all courses.

The required courses are: CT 1311, "C" Language; CT 1330, Data Structures; CT 1345, Assembly Language; CT 1340, Software Engineering; CT 1381, Operating Systems; CT 1393, UNIX.

Minor in Electrical Engineering Technology

To qualify for a minor in electrical engineering technology, the student must complete the following five courses and three laboratories. A student does not have to be enrolled in the School of Engineering Technology to declare the minor, but the student must meet the published prerequisites for all courses.

The required courses are: EET 1151, Circuit Analysis 1; EET 1152, Circuit Analysis 2; EET 1324, Circuit Lab 1; EET 1325, Circuit Lab 2; EET 1311, Electronics 1; EET 1312, Electronics 2; EET 1323, Electronics Lab; EET 1330, Energy Conversion; or EET 1377, Control Engineering 1.

Minor in Mechanical Engineering Technology

To qualify for a minor in mechanical engineering technology, the student must complete the following six courses and two laboratories. A student does not have to be enrolled in the School of Engineering Technology to declare the minor, but the student must meet the published prerequisites for all courses.

The required courses are: MET 1301, Mechanics A; MET 1302, Mechanics B; MET 1314, Stress Analysis A; MET 1370, Fluid Mechanics A; MET 1390, Measurements and Analysis Lab; MET 1340, Thermodynamics A; MET 1380, Materials A; MET 1391, Tech Lab A.

To obtain credit for a minor in engineering technology, students must file a petition form with the School of Engineering Technology in 120 Snell Engineering Center. Interested students should confer with an adviser as soon as possible. Advisers are Dean Thomas Hulbert and Mr. Roy Dalsheim, 120 Snell, 617-373-2500.

Aerospace Maintenance Engineering Technology

For transfer students the school offers a three-year Bachelor of Science in Engineering Technology degree with a major in aerospace maintenance engineering technology. This program, designed in conjunction with East Coast Aero Technical School, is for students who have successfully completed a program in aircraft and power-plant mechanics or similar technician programs.

To enter the program, students must pass college algebra, precalculus, calculus 1, and chemistry. During their three years of study, students participate in the cooperative education program.

These students have in their possession various federal licenses and qualify for exceptional cooperative education experiences with a number of aerospace firms involved with national defense and space exploration. They are especially sought after by co-op employers dealing with airframe integrity and power plant configuration.

Graduates of this program are prepared to pursue technical, support, or management positions in the aircraft industry. They may also become members of engineering teams in spacecraft or aircraft component manufacturing. Other graduates of the program may assume design/applications positions in either civilian or military aerospace markets.

Bachelor of Science Curriculum

Quarter 1	ENG 1110, Freshman English 1; GET 1170, Engineering Graphics 1; MTH 1194, Calculus 2; PHY 1191, Physics 1; and PHY 1196, Physics Lab 1.
Quarter 2	ENG 1111, Freshman English 2; GET 1171, Engineering Graphics 2; PHY 1192, Physics 2; PHY 1197, Physics Lab 2; and one social science/humanities elective.
Quarter 3	MET 1380, Materials A; MTH 1195, Calculus 3; PHY 1193, Physics 3; PHY 1198, Physics Lab 3; and one social science/humanities elective.

Quarter 4	ECN 1115, Principles of Macroeconomics; EET 1320, Electricity and Electronics I; MET 1301, Mechanics A; CMN 1115, Foundations of Communication; and GET 1100, Computer Programming.
Quarter 5	ENG 1125, Technical Writing; MET 1302, Mechanics B; MET 1314, Stress Analysis A; and one social science/humanities elective.
Quarter 6	MET 1340, Thermodynamics A; MET 1370, Fluid Mechanics A; MET 1390, Measurement and Analysis Lab; MET 1481, Materials B; and one technical elective.
Quarter 7	MET 1341, Thermodynamics B; MET 1391, Technology Lab A; one technical elective; and two social science/humanities electives.

Computer Technology

Leonard F. Dow, MS, *Coordinator for Computer Technology*

Computer technology's major functions include programming the computer for engineering, scientific, and business applications; designing, engineering, and testing computers; and interfacing computers with various types of equipment to enhance automation.

The computer technology program provides degree candidates with both academic and technical learning experience relevant to the hardware and software systems currently used in industry. Students also choose technical electives in their area of interest. High-level theory courses enable students to continue their educational and professional development beyond the baccalaureate level. Some students go on to pursue master's degrees in either business administration or information systems.

A typical sophomore's cooperative education responsibilities might include setting up and configuring various computer platforms, installing software packages, providing phone support for technical inquiries, and performing elementary network troubleshooting and some software research. Other typical positions explore the various aspects of manufacturing processes, including assembly and quality assurance.

As seniors, typical students have progressed to more sophisticated and challenging assignments. They may be assigned the responsibility of maintaining entire software applications as well as the databases for these programs, or they may be asked to convert old versions of application scripts to conform to new coding principles. Other assignments may include providing advanced technical software and hardware support for end users both on and off site.

Graduates of this program are equipped to play important roles on engineering support teams that implement engineering design projects. They also work closely with engineers as members of research and production teams.

Bachelor of Science Curriculum

Quarter 1	ENG 1110, Freshman English 1; GET 1170, Engineering Graphics 1; MTH 1191, College Algebra; PHY 1191, Physics 1; and PHY 1196, Physics 1 Lab.
Quarter 2	ENG 1111, Freshman English 2; GET 1100, Computer Programming for Engineering Technology; MTH 1192, Pre-Calculus; PHY 1192, Physics 2; and PHY 1197, Physics 2 Lab.
Quarter 3	CT 1150, Computer Organization; MTH 1193, Calculus 1; PHY 1193, Physics 3; PHY 1198, Physics Lab 3; and CMN 1115, Foundations of Communications.
Quarter 4	CT 1311, Programming in C++ Language; ECN 1115, Principles of Macroeconomics; EET 1151, Circuit Analysis 1; and MTH 1194, Calculus 2.
Quarter 5	CT 1330, Data Structures; EET 1152, Circuit Analysis 2; MTH 1195, Calculus 3; and one social science/humanities elective.
Quarter 6	CT 1335, Numerical Methods; CT 1340, Software Engineering; CT 1345, Assembly Language; and CT 1368, Semiconductor Logic.
Quarter 7	ENG 1125, Technical Writing; CT 1369, Computer Logic; CT 1374, Introduction to CPU Hardware; and CT 1381, Operating Systems.
Quarter 8	CT 1375, CPU Hardware Architecture; CT 1380, Data Communications; one computer technology elective; and one social science/humanities elective.
Quarter 9	CT 1355, Microprocessor Peripheral Hardware; CT 1480, Local Area Networks 1; two computer technology electives.
Quarter 10	CT 1356, Complex Peripheral Hardware; CT 1360, Industry Software; one computer technology elective; and one social science/humanities elective.
Quarter 11	CT 1351, Advanced Computer Organization; CT 1365, Industry Hardware; one technical elective; and one social science/humanities elective.

Electrical Engineering Technology

Leonard F. Dow, MS, *Coordinator for Electrical Engineering Technology*

The focus of electrical engineering technology is the design and operation of equipment and systems related to power, communications, data processing, and electrical control. Its major functions include generating, transmitting, and distributing electrical energy for light and power purposes; developing and producing equipment for telephone, radio, television, radar, and communication; designing and constructing data-processing systems and analog or digital computers; and applying electrical and electronic devices in the control of processes and manufacturing.

The program in electrical engineering technology offers theory courses at the upper end of the technology spectrum, and students may take technical electives in areas that interest them.

A sophomore may be given the cooperative education assignment of creating and editing electrical blueprints, doing shell drawings, or providing ductwork drawings along with the appropriate heat loading calculations for companies engaged in electrical construction. Other entry positions include assembly, bread boarding, inspection, and quality assurance.

Seniors typically have progressed to positions of much greater responsibility, such as installing and maintaining computer network systems, maintaining on-line base maps for public utility systems, and coordinating architectural and electrical plans with construction companies and suppliers. Students have also had co-op positions in consulting engineering firms as analysts, telemarketers in sales engineering, and environmental safety compliance officers.

Bachelor of Science Curriculum

Quarter 1	ENG 1110, Freshman English 1; GET 1170, Engineering Graphics 1; MTH 1191, College Algebra; PHY 1191, Physics 1; and PHY 1196, Physics Lab 1.
Quarter 2	ENG 1111, Freshman English 2; GET 1100, Computer Programming for Engineering Technology; MTH 1192, Pre-Calculus; PHY 1192, Physics 2; and PHY 1197, Physics Lab 2.
Quarter 3	GET 1171, Engineering Graphics 2; MTH 1193, Calculus 1; PHY 1193, Physics 3; PHY 1198, Physics Lab 3; and ECN 1115, Macroeconomics.
Quarter 4	CMN 1115, Foundations of Communication; EET 1151, Circuit Analysis 1; MTH 1194, Calculus 2; and one social science/humanities elective.
Quarter 5	EET 1123, Circuits Lab 1; EET 1152, Circuit Analysis 2; MET 1319, Mechanics; MTH 1195, Calculus 3; and one social science/humanities elective.
Quarter 6	EET 1125, Circuits Lab 2; EET 1311, Electronics 1; EET 1353, Circuit Analysis 3; EET 1360, Engineering Analysis 1; and ENG 1125, Technical Writing.
Quarter 7	EET 1310, Electrical Measurement; EET 1312, Electronics 2; EET 1323, Electronics Lab; EET 1354, Circuit Analysis 4.
Quarter 8	EET 1313, Electronics 3; EET 1327, Advanced Electronics Lab 1; EET 1330, Energy Conversion; one technical elective; and one social science/humanities elective.
Quarter 9	EET 1314, Pulse and Digital 1; EET 1328, Advanced Electronics Lab 2; EET 1337, Distributed Systems; one technical elective; and one social science/humanities elective.
Quarter 10	EET 1329, Advanced Electronics Lab 3; EET 1370, Digital Computers 1; EET 1377, Control Engineering 1; and one technical elective.
Quarter 11	EET 1371, Digital Computers 2; EET 1378, Control Engineering 2; one technical elective; and one social science/humanities elective.

Mechanical Engineering Technology

George F. Kent, MS, PE, *Coordinator for Mechanical Engineering Technology*

As a technical field that deals with the use of machinery to harness power resources and perform useful work, mechanical engineering technology focuses on static forces, motion, and the kinetics of devices activated by hydraulic, electrical, mechanical, or thermodynamic forces.

Mechanical engineering technologists design and install machinery ranging from pocket watches to the largest energy-producing facilities. They help develop and produce engines and transport equipment such as automobiles, aircraft, ships, and railway cars. They also help construct and operate furnaces, boilers, and heating and air-conditioning equipment.

Students in mechanical engineering technology apply the principles of science and mathematics to their chosen fields and convert theories into practical techniques and processes. They learn how to communicate technical information effectively so they may become integral members of an engineer-technologist-technician design and operations team.

Sophomore mechanical engineering technology majors generally are referred to cooperative education positions such as technicians in facility or plant engineering departments, quality assurance positions in light and heavy manufacturing, and prototype development and design teams. A sophomore often will be given the responsibility of drawing mechanical designs and blueprints using various CAD software.

As seniors, these students have progressed to highly responsible positions in manufacturing and production, such as design and test technicians and field service engineers.

Bachelor of Science Curriculum

Quarter 1	ENG 1110, Freshman English 1; GET 1100, Computer Programming for Engineering Technology; GET 1170, Engineering Graphics 1; MTH 1191, College Algebra; PHY 1191, Physics 1; and PHY 1196, Physics 1 Lab.
Quarter 2	ENG 1111, Freshman English 2; GET 1100, Computer Programming for Engineering Technology or GET 1170, Engineering Graphics 1; MTH 1192, Pre-Calculus; PHY 1192, Physics 2; and PHY 1197, Physics 2 Lab.
Quarter 3	GET 1171, Engineering Graphics 2; MTH 1193, Calculus 1; PHY 1193, Physics 3; PHY 1198, Physics Lab 3; and ECN 1115, Macroeconomics.
Quarter 4	EET 1320, Electricity and Electronics; GET 1364, Kinematics; MET 1301, Mechanics A; and MTH 1194, Calculus 2.
Quarter 5	CHM 1130, Fundamentals of Chemistry; CHM 1138, General Chemistry Lab; MET 1302, Mechanics B; MET 1314, Stress Analysis A; and MTH 1195, Calculus 3.
Quarter 6	CMN 1115, Foundations of Communication; MET 1303, Mechanics C; MET 1315, Stress Analysis B; MET 1340, Thermodynamics A; and MET 1390, Measurement and Analysis Lab.
Quarter 7	ENG 1125, Technical Writing 1; MET 1341, Thermodynamics B; MET 1370, Fluid Mechanics A; MET 1380, Materials A; and MET 1391, Technology Lab A.
Quarter 8	MET 1330, Mechanical Design A; MET 1343, Heat Transfer; MET 1371, Fluid Mechanics B; MET 1392, Technology Lab B; and one social science/humanities elective.
Quarter 9	MET 1331, Mechanical Design B; MET 1393, Technology Lab C; MET 1396, Machine Shop; one technical elective; and one social science/humanities elective.
Quarter 10	GET 1356, Engineering Economy; MET 1394, Technology Lab D; MET 1481, Materials B or MET 1416, Stress Analysis C; one technical elective; and one social science/humanities elective.
Quarter 11	MET 1342, Refrigeration and Air-Conditioning; MET 1395, Technology Lab E; and two social science/humanities electives.

College of Nursing

Eileen H. Zungolo, MEd, EdD, RN, *Dean*

Carole A. Shea, MS, PhD, RN, CS, FAAN, *Associate Dean and Director of Graduate School*

Janet A. Carroll, MS, RN, *Assistant Dean of Administration*

Christine Letzeiser, MS, RN, *Assistant Dean of Student Affairs*

Associate Professors

Jane F. Aroian, MSN, EdD, RN

Olivia M. Breton, MEd, RN

Elaine L. Capozzoli, MA, PhD, RN

Margery M. Chisholm, MS, EdD, RN, CS

Ellen T. Daly, MS, EdD, RN

Mary Anne Gauthier, MSN, EdD, RN

Patricia J. Hollen, MS, PhD, RN

Dorett Hope, MEd, EdD

Elizabeth M. Howard, MS, PhD, RN, ANP

M. Marcia Lynch, MSN, DNSc, RN

Geraldine A. Medici, MS, RN

Patricia Maguire Meserve, MS, PhD, RN

Carol A. Patsdaughter, MSN, PhD, RN

Susan J. Roberts, MS, DNSc, RN, ANP

Marilyn M. Smith, MS, MBA, RN

Mary E. Wilcox, MS, RN

M. Delaine Williamson, MS, MPH, RD

Assistant Professors

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Donna Newby, MSN, PhD, RN

Carol Williams, MS, DNSc, RN

The College of Nursing offers a Bachelor of Science program designed to prepare students to become professional nurses for practice in a variety of health-care settings, such as hospitals, community health centers, schools, and homes. The college aims to provide all students—including those with diverse backgrounds and changing career goals—with a broad-based education which will foster ongoing personal and professional growth.

Nursing is both a science-based process and a caring art. The curriculum offers instruction in the sciences with opportunities in the humanities. Since nursing practice focuses on promoting, preserving, and restoring the health and well-being of individuals, families, groups, and communities across the life span, the curriculum emphasizes a community-based primary care approach, which starts in the freshman year and builds throughout the program. This approach requires knowledge, skills, and attitudes related to health care that are comprehensive, culturally sensitive, continuous, effective, compassionate, and collaborative. Because the vast majority of people's lives are spent in the community, a significant part of the clinical program takes place in the community where people live, work, eat, rest, play, vote, and pray. Recognizing the equally important need to prepare nurses to care for ill clients in institutions, the program provides ample opportunities for nursing practice in hospitals, rehabilitation centers, and long-term care facilities. The curriculum is capped by courses that enable students to put leadership and management skills into action, and to synthesize the complete role of the professional nurse in a clinical practicum.

In addition to completing academic coursework, students must meet the cooperative education requirement, which gives them the opportunity to integrate the theory and practice of nursing in selected settings. Through more than fifty community and institutional health-care agencies in Greater Boston, and across the country, students gain experience in providing nursing care to a variety of clients and families. Students learn that nurses have major roles in wellness and health promotion, acute care, and long-term care.

The baccalaureate nursing program provides the educational background needed for graduate study in nursing specialties. Successful completion of the baccalaureate program allows our graduates to take the National Council Licensing Examination (NCLEX-RN) to become registered nurses.

The program is accredited by the National League for Nursing and approved by the Board of Registration in Nursing of the Commonwealth of Massachusetts. Accreditation and approval indicate that the program meets educational standards for faculty, curriculum design, student quality, and overall University support. The college subscribes to the standards established by the American Association of Colleges of Nursing, of which it is a member.

Class Entrance Requirements

The requirements listed are for the Class of 1996 and beyond. Students completing the nursing program prior to 1996 are strongly encouraged to meet these academic standards. The minimum overall quality-point averages (QPA) listed are required at year's end for students to advance to the next level or to graduate.

Freshman	1.6
Sophomore	2.0
Middler	2.0
Junior	2.0
Senior	2.0
To graduate	2.0

These averages reflect the minimum requirements for advancement; the faculty of the college highly recommends that students achieve higher grades in order to avoid academic difficulties as they progress through the program.

In addition, a grade of 2.0 or better is required in each nursing course. During the first year, nursing students must achieve a grade of C or better in BIO 1152, BIO 1153, and BIO 1154. The QPA for these science courses must be 2.0 before a student can enter the sophomore year. Other standards for progress, such as the minimum science QPA for the sophomore year, are published in the *College of Nursing Undergraduate Student Handbook* available at 211 Robinson Hall.

Special Requirements

Prior to entering, every student must have a physical examination, including a rubella titre and immunization for measles, mumps, rubella, and tetanus. Hepatitis B, PPD, and a chicken pox titre are required prior to clinical experience. Each year thereafter, the student must receive a health clearance. All students must carry malpractice insurance. Arrangements for this insurance are made by the University. Students in the College of Nursing are required to wear the approved school uniform in some clinical laboratory areas during academic quarters. A modification of the uniform is worn during cooperative education work experiences. All students assigned to a clinical nursing course must be certified in cardiopulmonary resuscitation (CPR); annual recertification is required. Students enrolled in the clinical courses must have access to a car to travel to assigned agencies.

Graduation Requirements

The College of Nursing reserves the right to amend courses, the program, and degree requirements to fulfill its responsibility as a professional program leading to licensure. The faculty has designed a curriculum to prepare nursing students for health care practice that addresses common goals to improve our nation's health. The new curriculum is in place for all classes in the 1996-1997 academic year. Degree candidates must complete all prescribed courses, a minimum of 176 quarter hours of credit. An overall science and nursing QPA of 2.0, with a C in all nursing courses and specified minimal grades as set forth in the policies of the college are required. Degree requirements are based upon the year of graduation, determined by the date of entry or re-entry into the College of Nursing. Degree requirements and the year of graduation for a student who does not make academic progress for more than two quarters will be subject to review and possible change. Candidates must meet the requirements of the Department of Cooperative Education and University residency requirements.

Transfer Student Track

The College of Nursing welcomes transfer students and students planning a career change who have a degree in another field, or who have completed a minimum of 58 quarter hours or transfer credits that are appropriate to curriculum requirements. These credits must include two anatomy and physiology courses (with labs) and one chemistry course (with lab) and reflect a minimum overall QPA of 2.5. A microbiology course (with lab) is strongly recommended. Students are accepted into this track for the fall quarter only. Once accepted, the transfer student follows a fixed curriculum plan that includes a minimum of three quarters of cooperative education experience. Students may complete baccalaureate program requirements in approximately two years and nine months.

RN to BSN Option

The college accepts registered nurses who wish to complete requirements for a Bachelor of Science in Nursing degree into the part-time University College evening section. The length of the program varies, depending on the individual's previous educational experience and ability to achieve advanced placement through the development of a portfolio to validate prior learning. The RN to BSN curriculum option has been revised to reflect the need for community-based primary care learning experiences with emphasis on management and leadership. Students entering the program in Fall 1996 will participate in course offerings and program requirements that are designed to increase flexibility and facilitate learning for working nurses.

Bachelor of Science Curriculum

Quarter 1	BIO 1152, Integrated Anatomy and Physiology 1; ENG 1110, Freshman English 1; MTH 1101, Applications of Algebra; NUR 1106, Introduction to Professional Nursing; and COP 1370, Introduction to Career Management.
Quarter 2	BIO 1153, Integrated Anatomy and Physiology 2; ENG 1111, Freshman English 2; PSY 1111, Foundations of Psychology 1; and NUR 1108, Nursing Health Assessment.

Quarter 3	BIO 1154, Integrated Anatomy and Physiology 3; PSY 1271, Social Psychology, NUR 1102, Introduction to Human Nutrition; and NUR 1107, Nursing Process and Skills.
Quarter 4	BIO 1120, Basic Microbiology; SOC 1100, Introduction to Sociology; and NUR 1206, Promoting Healthy Childbearing and Childrearing.
Quarter 5	CHM 1106, General Chemistry for Health Professionals 2; NUR 1307, Influences in Health and Disease; and NUR 1208, Promoting Healthy Adulthood and Aging.
Quarter 6	NUR 1202, Pathophysiological Concepts for Clinical Nursing; NUR 1306, Promoting Health Restoration in Children; and PCL 1306, Pharmacology 1.
Quarter 7	ENG 1350, Intermediate Writing; NUR 1308, Promoting Health Restoration in Adults; and PCL 1307, Pharmacology 2.
Quarter 8	NUR 1408, Promoting Mental Health; PHL 1165, Moral Problems in Medicine; and SOC 1320 Introduction to Statistical Analysis 1.
Quarter 9	ECN 1130, Medical Economics; NUR 1406, Promoting Healthy Communities; and NUR 1502, Introduction to Research in Nursing.
Quarter 10	NUR 1508, Management and Leading in Nursing; one humanities elective; one computer elective; and one history elective.
Quarter 11	NUR 1507, Comprehensive Nursing Practicum; and three general electives.

Electives

The College of Nursing offers electives that enable students to satisfy their personal objectives. They include Independent Study; The Nurse Entrepreneur; Wellness; and Women's Health Choices and Decisions.

Alternative Freshman-Year Program

The Alternative Freshman-Year (AFY) Program is designed for students who need help in strengthening their basic skills while they take the required freshman-year coursework in English, mathematics, and social sciences.

The program carefully monitors student participation in small classes that are based on supportive group-learning procedures. The program also provides participants with extensive help in clarifying their academic and career goals.

Through the combination of a carefully prescribed curriculum and the attention of faculty whose expertise is in developmental education, students follow a program that fits their individual needs. These same faculty teach the majority of the courses taken by AFY students, provide advice and support, and participate in a "House Plan" in which faculty members share information on each student's progress.

The program's flexibility not only helps AFY students in their ability to do college-level work, but also allows them to consider several different areas of study before selecting a major. Students in this program are considered regular degree candidates with an undeclared major and can enter their desired majors as sophomores.

In preparation for gaining sophomore status, AFY students follow one of four curriculum tracks: arts and sciences, business, criminal justice, and health/science. With the exception of the health/science track, students may change either their intended major or curriculum track through the winter quarter of the freshman year without falling behind.

Students in the program have access to all physical education facilities and co-curricular programs. Alternative freshman-year students are encouraged to make extensive use of the AFY Peer Tutoring Program, the Academic Assistance Center, and the math and writing centers. As for all Northeastern students, the Counseling Center is available for personal and academic counseling as well as for vocational testing and counseling.

Class Entrance Requirements

To qualify for sophomore status in the College of Arts and Sciences, the College of Business Administration, and the College of Criminal Justice, AFY students must earn a quality-point average of 1.8 or higher and successfully complete a minimum of forty-four programmed credits, as well as required courses. The College of Business Administration requires students to earn at least a 1.8 in the four core courses: ECN 4601, ENG 4014, MGT 4110, and MTH 1113.

Alternative Freshman-Year students may also qualify, on a space-available basis, for all majors in the Bouvé College of Pharmacy and Health Sciences with the exception of Physical Therapy, by following the AFY health/science curriculum track. Such students must complete a minimum of fifty-nine programmed credits over four quarters, including three chemistry, two biology and two advanced math courses with a QPA of 3.0 or higher, with no grade below C in the science courses. Repeaters in the Alternative Freshman-Year Program are not eligible for any majors in the Bouvé College.

AFY students who do not meet the requirements for sophomore status in their intended majors may return as "repeating" or "continuing" freshmen and satisfy specific requirements to complete the freshman year in their particular program.

Tuition and Fees

Tuition and fees for the Alternative Freshman-Year Program are the same as for students in the full-time day programs. Payment of the standard tuition for the first three academic quarters entitles students to forty-eight credit hours of instruction. Thus, those who take the forty-four programmed credits are entitled to a four-quarter-hour tuition adjustment at the regular freshman rate.

Students following the health/science curriculum track attend four consecutive quarters before qualifying for sophomore standing. However, such students incur no tuition charges for the fourth quarter of study, and thus have the same tuition costs as those in the business and nonbusiness tracks.

Business Track	Quarter 1	ED 4003, Integrated Language Skills Development A; ENG 4013, Fundamentals of English 1; HST 4110, History of Civilization A <i>or</i> ECN 4601, Economics 1; and MTH 1000, Math Preliminaries 1.*
	Quarter 2	ED 4004, Integrated Language Skills Development B; ENG 4014, Fundamentals of English 2; HST 4110, History of Civilization A <i>or</i> MGT 1115, Introduction to Business; and MTH 1010, Math Preliminaries 2.*
	Quarter 3	ED 4005, Integrated Language Skills Seminar; ECN 4601, Economics 1; MGT 4110, Survey of Business and Management; HST 4111, History of Civilization B; MTH 1113, Math for Business*; and a directed elective <i>or</i> ENG 1111, Freshman English 2.
Arts and Sciences, Criminal Justice, or Undecided Track	Quarter 1	ED 4003, Integrated Language Skills Development A; ENG 4013, Fundamentals of English 1; MTH 1000, Math Preliminaries 1*; and SOC 4010, Principles of Sociology 1 <i>or</i> HST 4110, History of Civilization A.
	Quarter 2	ED 4004, Integrated Language Skills Development B; ENG 4014, Fundamentals of English 2; HST 4110, History of Civilization A <i>or</i> SOC 4010, Principles of Sociology 1; and MTH 1010, Math Preliminaries 2.*
	Quarter 3	ED 4005, Integrated Language Skills Seminar; ENG 1111, Freshman English 2 <i>or</i> a directed elective; HST 4111, History of Civilization B; POL 4106, Introduction to Politics; and SOC 4011, Principles of Sociology 2; <i>or</i> an elective.
Health Sciences Track	Quarter 1	CHM 1110, General Chemistry Preliminaries; ED 4001, Integrated Language Skills Development 1; ENG 4013, Fundamentals of English 1; and MTH 1010, Math Preliminaries 2.*
	Quarter 2	CHM 1111, General Chemistry 1; ED 4002, Integrated Language Skills Development 2; ENG 4014, Fundamentals of English 2; and MTH 1106, Fundamentals of Mathematics.*
	Quarter 3	BIO 1140, Basic Animal Biology 1; CHM 1106, General Chemistry 1 <i>or</i> CHM 1122, General Chemistry for the Life Sciences; ENG 1111, Freshman English 2 <i>or</i> a directed elective; and a directed elective.
	Quarter 4	ED 4005, Integrated Language Skills Seminar; BIO 1141, Basic Animal Biology 2; MTH 1107, Functions and Basic Calculus*; and a directed elective.

*In each curriculum, students will be placed in a mathematics course based on testing results.

Course Descriptions

Arts and Sciences

Please note some courses in the College of Arts and Sciences are duplicated in different departments or colleges, or within a department. You may not receive credit for two such courses. If you have a question about whether one course does overlap with another, please consult the departments involved and the Office of the Dean before taking the course.

Numbers in parentheses within course descriptions refer to core curriculum categories listed on page 31.

African-American Studies

AFR 1100 Introduction to African-American Studies

4 QH

Explores several of the possible historical, sociological, cultural, and political avenues of study in the broad interdisciplinary spectrum of African-American studies. Provides an introductory overview of the field and will offer an opportunity to identify areas for more specific focus.

AFR 1121/ENG 1678 Early African-American Literature

4 QH

Surveys the development and range of black American writers, emphasizing poetry and prose from early colonial times to the Civil War. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

AFR 1131/HST 1525 African-American History 1

4 QH

Covers the development of black America from the period of slavery through Reconstruction, with emphasis on the historical links between Africa and America and the impact on black development in the United States. (III)

AFR 1132/HST 1526 African-American History 2

4 QH

Examines the development of black America from Reconstruction to the present, and the effects of events in the United States and world history on the development of black America. Emphasizes contemporary issues and how these issues can be seen through a historical perspective. *Prereq.* AFR 1131 or permission of instructor.

AFR 1133 History of Blacks in the Media and the Press

4 QH

Offers a historical and visual examination of the development of the African-American experience in the American mass media and press. Analyzes contemporary and historical literature, films, and people with respect to history, racism, images, psychology, and social movements. Newspapers, film, television, and radio are prime focal points, and are used to help form strategies for the future of black Americans.

AFR 1141 Educational Issues and Minority Communities 1

4 QH

Focuses on some of the important issues in today's urban elementary and secondary education systems. The analysis will look at the historical development of these issues, and students will be encouraged to think about and discuss the issues' future significance.

AFR 1151/ART 1218 Survey of African-American Art

4 QH

Offers a historical and critical examination of African-American art from the nineteenth century to the present, with special emphasis on the effects of European and African art styles on the black artist in America. (II)

AFR 1153/MUS 1104 Survey of African-American Music

4 QH

Studies the impact of African rhythm on black music, the New Orleans coalescence, regional development, ragtime, the emergence of large bands, the harmonic revolution of the forties, bebop, the 1960s avant-garde, and subsequent developments. Some analysis of specific jazz phenomena is included.

AFR 1155 Foundations of Black Culture

4 QH

Studies music, literature, visual and performing arts, and other cultural and artistic traditions as they have evolved among African, African-American, and Caribbean peoples.

AFR 1156/MUS 1181 Music of Africa

4 QH

Provides a broad survey of the musical traditions of Africa with respect to their historical, social, and cultural backgrounds. Musical organization, musical practice, and aspects of style will all be discussed in light of possible contributions to contemporary African-American music.

AFR 1161/ECN 1170 Economic Issues in Minority Communities

4 QH

Examines minority life-styles, perspectives, self-images and social position in the urban community, particularly in terms of the application of basic economic theories to the economic realities of minority communities. (VI)

AFR 1171 Contemporary Black Politics

4 QH

Analyzes the evolution of black political thought in America and examines the socio-political contests that have served as catalysts to modern black political movements.

AFR 1191/HST 1620 Early African Civilization

4 QH

Studies the ancient empires of Africa, especially Ghana, Songhai, Mali, Zimbabwe, the city states of East Africa, Nubia, Egypt, Ethiopia, and the Congo Kingdom.

AFR 1193 Africa Today

4 QH

Studies the complex political and social picture of Africa. This course examines some of the salient features of black art, politics, and identity in Africa.

AFR 1195 Identity and Nationalism in Africa

4 QH

Studies how centuries of imperialism, the struggle for national unity, and the continuing problems of racism and rivalry between factions have affected the present identities and nationalist movements in Africa. This course explores problems peculiar to Africa and to any group of nations struggling against colonial ideas. Tribalism and the effects of European colonial partition on African identity are discussed.

AFR 1196 The Black Experience in the Caribbean

4 QH

Offers a descriptive and interpretive analysis of the growth of the modern black community in the Caribbean. Although the focus will be on the contemporary period, the course will examine that period in the context of colonialism and slavery in the Americas. Important racial, social, political, economic, and religious issues will be addressed.

- AFR 1197/HST 1621 Modern African Civilization** 4 QH
Explores African history and culture from 1800 to the present era. Emphasis will be placed on the relationship between Europe and Africa, the circumstances surrounding the imperialist partition of Africa, and the decolonization process. (IV)
- AFR 1200/ART 1216 Survey of African Art** 4 QH
Traces the historical development of African art from traditional to contemporary styles and periods. Emphasizes the study of art objects, the social and historical context in which aesthetic issues are shaped, and the impact of religion and external forces on creativity. Uses lectures, critiques, discussions, fieldwork, and hands-on interaction with art objects.
- AFR 1211 African-Americans in Science, Technology, and Medicine** 4 QH
Studies the contributions that African-Americans have made to the development of science and technology in America. It examines the cultural and social factors that have encouraged blacks to work in the fields of science (biology, chemistry, physics) and technology (engineering and medicine). Certification of blacks within the American scientific community and the availability of science to the past and contemporary African-American communities are also explored. Readings, discussions, individual research topics, and interviews with black scientists, inventors/engineers, and doctors are used to develop the basic course material.
- AFR 1220 The Black Novel** 4 QH
Focuses on the black novelist's place in the history of American fiction. Special attention is given to Chesnutt, Toomer, Wright, Ellison, and contemporary novelists, and to their different perceptions of the black experience in America.
- AFR 1223/MUS 1265 Jazz Improvisation 1** 4 QH
Focuses on repertory as well as performance. Examines the great improvisational artists in American music, such as Charlie Parker, Miles Davis, and John Coltrane. Approaches analysis from a theoretical as well as a practical perspective. Explores the use of rhythm, chords, scales, and modes in the creative improvisation process.
- AFR 1231/LIN 1231 African-American English** 4 QH
Addresses topics in the study of African-American English. Investigates the hypotheses about the origins of African-American English as well as arguments about the relation of the dialect to English and other languages. Considers issues regarding the use of the dialect in the educational context.
- AFR 1234/MUS 1234 Jazz Ensemble** 1 QH
Designed to serve both music majors and nonmajors, this is a performance/theory/history offering of the varied styles and techniques of performance in the jazz tradition of African-American musics. Students are admitted to the course by permission of the instructor following an interview and/or audition. Students are drawn from all segments of the University. Repertory is taken from the standard jazz literature as well as investigations of new works. Improvisational and interpretational technique are the core content of the course. Both the NU Band and the NU Jazz Combo are represented together in this course.
- AFR 1235 Black History of Boston** 4 QH
Examines the social, economic, political, and educational history of Boston's black community in the nineteenth and twentieth centuries. The development of the black community and its institutions is a major focus, and students are encouraged to study the past in an attempt to understand the present and interpret the future. Research data include participant observation, oral history, interviews, and primary and secondary source materials.
- AFR 1240 Contemporary Issues in Black Society** 4 QH
Introduces the various issues and problems that confront black Americans, including some of the realities of the social, political, and economic problems of contemporary black experience. Students are asked to assess the validity of specific social theories in relation to the black experience. (VI)
- AFR 1241 The Black Family** 4 QH
Studies how the black family functions, both interpersonally and as a social unit. Anthropological and sociological theories deal with variations in family structure and the function of the black family in black society. The effects of slavery and colonization on the black family structure and functions are also explored. A side issue is a discussion of some of the differences and similarities between African, African-American, and African-Caribbean families.
- AFR 1248 Race Relations in America** 4 QH
Examines the interrelations of ethnic, cultural, and minority groups in the United States. Focus is on the nature of racial conflicts, discrimination, reverse discrimination, personal and institutional racism, and racial and ethnic stereotyping. Discussion considers avenues of improvement in attitude awareness and change.
- AFR 1249 Black Community and Social Change** 4 QH
Explores the dynamic changes experienced by black communities in the United States since the Civil Rights era in the 1950s and 1960s. Includes discussions and applications of key concepts and methods in several fields of the social sciences, and seeks to understand the relationship of race, class, gender, and social change in addressing the current search for policies and programs for community development.
- AFR 1251 Survey of Black Theater and Drama** 4 QH
Focuses on the development of black drama during the nineteenth and twentieth centuries, with emphasis on modern developments and their political and cultural significance. Same as THE 1118.
- AFR 1271/POL 1308 The Politics of Poverty** 4 QH
Explores what is referred to as the poverty system: how and why there is poverty, how it affects people's lives, and how it can be eliminated. As a discussion-centered course, relies on simulations, small-group work, and experience-based learning; examines the relations between poverty, racism, and the economic, political, and administrative systems. Evaluates a number of alternatives and provides an opportunity for clarifying individual assumptions and feelings about poverty.
- AFR 1280/PSY 1280 Black Psychological Identity** 4 QH
Provides an interdisciplinary look at the social, political, and psychological factors shaping contemporary African-American identity. Explores several different factors that interact with blackness to shape the diversity of African-American experience, such as skin color, gender, culture, and class. Studies black identity as it has been conceptualized, measured, and researched by psychologists. Readings include essays written by important African-American thinkers, fiction and autobiographical narratives, as well as empirical research in the field of psychology.

AFR 1294 Third World Politics**4 QH**

Offers a comparative regional analysis of the political systems of third world nations of Africa, Asia, Latin America, and the Caribbean. Emphasis is on development strategies; problems of development, including national identity, political socialization and participation, national defense, and urbanization; and the positions of third world nations in the international community.

AFR 1295 Politics of South Africa**4 QH**

Examines contemporary political developments in South Africa. Focuses on the historical development of the system of racism called apartheid and the liberation movements, and the struggle for a democratic South Africa. Explores the role of the United Nations, the Organization of African Unity, the United States, and other international organizations and countries.

AFR 1297/HST 1605 Caribbean History**4 QH**

Analyzes the development of the Caribbean from slavery to the present. The focus will be on the period 1918-1962 especially, and emphasis will be on the historical analysis of the relationship of the Caribbean with the United States and black Americans.

AFR 1300, AFR 1301, AFR 1310, AFR 1311 Directed Study**4 QH each**

Offers the ambitious student the opportunity to pursue a special intellectual interest not covered by the department course offerings and to work on this interest with the department faculty member of his/her choice. The faculty member will closely supervise the project and act as adviser for the duration of the quarter.

AFR 1342/POL 1342 Government and Politics of Africa**4 QH**

Explores contemporary politics in African nations south of the Sahara using films, maps, news clips, discussions, and readings. Studies South Africa, Nigeria, Kenya, and Ethiopia. Examines apartheid, colonialism, Afro-Marxism, chieftaincy, economic development, and Pan-Africanism. (VI)

AFR 1350 Research Seminar**4 QH**

Provides students the opportunity, first, to identify a substantive area of their concern (for example, welfare, political leadership, education) and to define a related problem in a research context; second, to be supervised in designing a research methodology most appropriate for examining the problem area; and third, to conduct extensive research, test the hypothesis, and draw conclusions based on data analysis techniques.

AFR 1355 Advanced Seminar**4 QH**

Offers students the opportunity to prepare a professional research paper under the close supervision of a scholar interested in students' particular research areas. The senior thesis is required of all African-American Studies majors. *Prereq.* *Permission of instructor.*

AFR 1380 Junior/Senior Honors Program**4 QH**

For details contact the honors office.

AFR 1401 History of East Africa**4 QH**

Deals with the precolonial period and the problems of the partition of Africa in the first section of the course. The second section focuses on the classical colonial period and the transformations of colonial policy after World War II, with particular emphasis on the ambiguity of decolonization and those features of the colonial system that seem to have become a part of the East African social and political environment.

AFR 1403/HST 1623 History of West Africa**4 QH**

Studies the history of West Africa and its struggle for internal unity, economic development, and social justice. The Pan-Africanist ideology, W.E.B. DuBois's writings, African socialism, and the consolidation of power and leadership are some of the topical objectives in this study of African liberation, particularly the rise of West Africa.

AFR 1405/HST 1625 History of South Africa**4 QH**

Studies pre-colonial South Africa and the conflict between Africans and the Dutch and English settlers. The course then focuses on the formation and transformation of colonial policy after World War II, with particular emphasis on racism, neo-colonialism, liberation movements, and international involvement in the apartheid system. (VI) *Prereq.* *AFR 1491 or permission of instructor.*

AFR 1415/LIN 1415 African Language**4 QH**

Seeks to prepare students for serious theoretical and practical study of the West African language and literature known as Kwa, the largest language subgroup in the Niger-Congo family. Students will explore the classification of African languages, the application of basic linguistics, and the history of these languages in Africa and the Western hemisphere, all leading to an introduction to spoken Yoruba and Igbo.

AFR 1421 African-American Literature 2**4 QH**

Continues AFR 1127. Focuses on principal writers and their major themes. *Prereq.* *AFR 1127 or permission of instructor.*

AFR 1451/MUS 1112 Jazz**4 QH**

Examines the evolution of the creative improvisational musical styles commonly called jazz, from its African-American roots to its status as one of America's classical musics and an internationally valued art form. Explores the contributions of African and European musical traditions and African-American spirituals, work songs, and blues. Examines major contributors and stylistic development and change through selected audio and audio-visual presentations. Also considers the socio-cultural dynamics that have affected musical evolution and acceptance.

AFR 1470 Black Political Thought**4 QH**

Examines black opinions, from the radical to the ultra-conservative, of the United States political system. The focus is historical in context and will address notions of political socialization and the development of black political ideologies.

AFR 1575/PSY 1575 Community Psychology Laboratory**4 QH**

Teaches critical thinking about the relationship between social problems and social psychological constructs. Students conduct field studies investigating the impact of a current social problem on community residents. Involves students in all aspects of survey research, including operationalization of key variables, development of survey instruments, data collection through interviews or telephone surveys, and the statistical analysis and interpretation of data. *Prereq.* *PSY 1271 or PSY/AFR 1280 or AFR 1100 and PSY 1211.*

AFR 1810, 1811, 1812, 1813 Junior/Senior Honors Project**4 QH each**

For details contact the honors office.

The following courses may be of interest to the student wishing to concentrate in African-American Studies. Descriptions for these courses may be found in the appropriate department listing.

PHL 1100 Introduction to Philosophy

PHL 1140 Social and Political Philosophy

PHL 1243 Existentialism

PHL 1335 Moral Philosophy

POL 1303 Political Behavior

POL 1362 Civil Liberties

POL 1386 International Law

SOA 1345 People in Cities

SOC 1147 Urban Social Problems

SOC 1170 Race and Ethnic Relations

SOC 1310 Class, Power, and Social Change

American Sign Language–English Interpreting

ASL 1101 American Sign Language 1 4 QH

Introduces American Sign Language and deaf culture, focusing on frequently used signs, basic rules of grammar, nonmanual aspects of ASL, introductory fingerspelling, and some cultural features of the Deaf community.

ASL 1102 American Sign Language 2 4 QH

Continues basic language and culture study. Offers an opportunity to build receptive and expressive ASL vocabulary. Topics include the use of signing space; and further use of nonmanual components, including facial expression and body postures. *Prereq.* ASL 1101, or permission of instructor.

ASL 1201 Intermediate American Sign Language 1 4 QH

Emphasizes further development of receptive and expressive skills, fingerspelling, vocabulary building, grammatical structures; encourages more extensive use of non-manual behaviors, classifiers, body postures, and signing space. Introduction to regional and ethnic sign variations and political and educational institutions of the Deaf community. *Prereq.* ASL 1102, or permission of instructor.

ASL 1202 Intermediate American Sign Language 2 4 QH

Offers intensive practice involving expressive and receptive skills in story telling and dialogue. Introduces language forms used in ASL poetry and the features of culture as they are displayed in art and the theatre. *Prereq.* ASL 1201, or permission of instructor.

ASL 1211 Deaf Culture 4 QH

Focuses on the status of Deaf people as a linguistic and cultural minority group. Topics include the role of American Sign Language in the Deaf community; educational and historical perspectives on deafness; and sociological and cultural make-up of the Deaf community. *Prereq.* ASL 1201, or permission of instructor.

ASL 1212 Deaf History 4 QH

Surveys the history of Deaf people in the Western world, with emphasis on the American Deaf community, their language, education, and relationship to hearing society. *Prereq.* ASL 1101, or permission of instructor.

ASL 1250/LIN 1250 Linguistics of American Sign Language 4 QH

Introduces the basic issues in linguistics by examining the structural properties of American Sign Language and comparing it with other languages having similar properties. Includes phonology (formational properties of signs), morphology (word formation rules, derivation, and inflection, complex verbs, classifiers, verb modulations), semantics (the meaning structure of signs), and syntax (the structure of ASL utterances in terms of old versus new information and the structure of ASL narratives). *Prereq.* ENG 1118, and the ability to follow lectures in ASL.

ASL 1301 Advanced American Sign Language Proficiency 4 QH

Emphasizes vocabulary building and mastery of fine points of grammar through rigorous receptive and expressive language activities. Explores a variety of signing styles and registers. Includes student-led discussions, debates, and reports on topics in Deaf culture, society, and current affairs. *Prereq.* ASL 1202, or permission of instructor.

ASL 1302 Advanced American Sign Language Proficiency 2 4 QH

Continues ASL 1301. *Prereq.* ASL 1301 or permission of instructor.

ASL 1401 American Sign Language Literature 4 QH

Examines and discusses various genres of American Sign Language. This course will concentrate on the work of current, recognized narrators in both literary and face-to-face storytelling traditions, and will also include selected autobiographical sketches, lectures, stories, and letters from the early 1900s by such historical figures as Clerc, Veditz, E.M. Gallaudet, Hotchkiss, and others. A videotaped research essay in ASL will be required at the end of the course. *Prereq.* ASL 1202 or permission of instructor.

ASL 1500 Introduction to Interpreting 4 QH

Presents an overview of the interpreting profession: responsibilities, ethics, and aptitudes of interpreters; professional associations; law and business of interpreting; the bilingual and bicultural context; basic translation and interpretation; environment and audience; special populations; freelance versus in-house positions; and evaluation and certification. *Prereq.* or concurrent: ASL 1211 and ASL 1301. *Majors only* or permission of instructor.

ASL 1505 ASL–English Interpreting 1 4 QH

Presents an overview of theoretical models. Examines the processes of translating and interpreting through practice of requisite skills and process tasks, and by applying skills and theory. *Prereq.* ASL 1302 with a grade of B or better and ASL 1500. *Majors only* or permission of instructor.

ASL 1506 ASL–English Interpreting 2 4 QH

Continues the study of interpreting, including practice of requisite skills and process tasks of increased complexity. Focuses on consecutive interpreting by applying process skills, contrasting ASL–English linguistics, and contrasting cultural analysis. *Prereq.* ASL 1505 with a grade of B or better. *Majors only* or permission of instructor.

ASL 1507 ASL-English Interpreting 3**4 QH**

Continues the study of interpreting, including practice of requisite skills and process tasks of increased complexity. Focuses on simultaneous interpreting through applying process skills, contrasting group dynamics, and analyzing discourse. *Prereq.* ASL 1506 with a grade of B or better. *Majors only or permission of instructor.*

ASL 1520 Interpreter Role and Ethics**4 QH**

Explores ethical standards and dilemmas in ASL-English interpreting and other professions through discussions, hypothetical situations, and role playing. Includes topics such as culturally objective standards, ethics and professional principles, power relations within groups, and the Registry of Interpreters for the Deaf code of ethics. *Prereq.* ASL 1500. *Majors only or permission of instructor.*

ASL 1521 Contrastive Analysis**4 QH**

Examines and contrasts the major linguistic features of ASL and English. The standard division of morphology, phonology, syntax, semantics, and register is reintroduced, and the various elements of both languages that fall under these divisions are compared point by point. *Permission of instructor.*

ASL 1522 Discourse Analysis for Interpreters**4 QH**

Presumes that the sentence is not the largest linguistic unit in all languages, including ASL, and that linguistic structures do not exist in isolation, but rather join together in a communicative process. Explores how discourse, such as conversations and texts, is structured, and emphasizes the discourse strategies of ASL. *Prereq.* ASL 1250 and ASL 1302 or permission of instructor.

ASL 1801, ASL 1802, ASL 1803, ASL 1804, ASL 1805**4 QH each****Directed Study**

Offers students an opportunity to go beyond course work of the regular curriculum or to pursue an individual learning project. May include research, practicum, or language development activity.

ASL 1810 Special Topics in Interpreting**4 QH**

Provides students with an overview of interpreting for populations with particular needs and preferences as well as interpreting in settings where specific knowledge bases are required. Populations settings will rotate and may include elderly, children, and foreign Deaf adults, as well as deaf-blind, multihandicapped, visual-gestural, educational, high-tech, and performing arts settings. *Prereq.* ASL 1506. *Majors only or permission of instructor.* *May be taken twice for credit.*

ASL 1820 Interpreting Practicum**4 QH**

Features practical interpreting experience in agencies serving Deaf people. Focuses on linguistic and ethical questions and dilemmas in a biweekly seminar format. Requires six hours per week in an agency. *Prereq.* ASL 1507 and ASL 1520, both with a grade of B or better. *Majors only or permission of instructor.* *May be taken twice for credit.*

Anthropology

SOA 1100 Peoples and Cultures**4 QH**

Surveys concepts in anthropology (the study of culture). Analyzes a range of societies in terms of such sociocultural institutions as kinship, gender relations, economics, politics, and religion. Examines important political and economic processes, such as colonialism and development, affecting cultures around the world.

SOA 1101 Cultural Meaning and Everyday Life**4 QH**

Studies the underlying patterns of meaning that are below the surface of everyday thought and behavior. Examines daily routines, leisure activities, joking and humor, speech patterns, popular culture, current folklore and mythology, nonmonetary economic transactions, kinship and friendship, and religion and ritual.

SOA 1104/IAF 1104 Cultures of the World**4 QH**

Explores cultural differences among peoples in societies around the globe and analyzes how diverse cultural patterns can be studied and described. (II)

SOA 1120 Camera on Culture: Visual Anthropology**4 QH**

Explores how cultures are portrayed on film. Examines anthropologists' use of film to gather information and represent other peoples. Also examines how filmmakers from postcolonial societies have addressed the respective cultures, the experience of colonialism, and the nature of film-making and film/video consumption in the third world. When possible, a production experience is included. (IV)

SOA 1125 Stones and Bones: Prehistory in the New World**4 QH**

Surveys the New World prehistoric cultures. Focuses on examining the work of archaeology and ethnohistory in a range of societies in both South and North America. Pays particular attention to social, political, and economic factors and how these work to promote such things as state formation, regional political alignment, and social differentiation. Studies the Incan, Mayan, and Aztec states, as well as the big game hunting traditions of the Plains, the forming communities of the Southwestern United States and Mississippi River area.

SOA 1133 The Americas from an Indigenous Perspective**4 QH**

Examines the history and culture of the Americas (North America, Mexico, Central America, South America, and the Caribbean) from the perspectives of its original inhabitants. Studies the ways indigenous peoples have been encoded into history, which influence how they are described in popular culture and textbooks and set the tone for current issues such as territorial autonomy, political representation, control of native resources, and human rights that are fundamental in their communities. Provides students with an understanding of how indigenous peoples view their past and their own contemporary problems through examining the construction of indigenous history by others and the way it is being reclaimed by indigenous peoples.

SOA 1146 Rural Workers in the Third World**4 QH**

Surveys the lives of rural peoples in the contemporary Third World. Focuses on people's organizing efforts to improve their living and working conditions. Uses case studies from Latin America and China. (IV)

SOA 1155 Individual and Culture**4 QH**

Explores the ways in which individuals are shaped by society and the ways in which they can effect change.

SOA 1160 Sex, Sex Roles, and Family**4 QH**

Examines popular and scientific notions about sex, gender relations, family, and kinship. Examines why our images of family, masculinity, and femininity are not universal by analyzing the patterns of sex roles, sexual practices, and kinship in other cultures. Discusses how and why relations between men and women change during times of socioeconomic and political change.

SOA 1185 War and Aggression 4 QH

Evaluates, by using anthropological investigations, the assumption that aggression is part of human nature and linked to sex differences. Discusses cross-cultural variation in violent behavior and warfare in the context of wider political and economic processes. Analyzes the widespread belief in innate masculine aggression as it relates to contemporary societal violence and militarism.

SOA 1220 Culture and Mental Illness 4 QH

Discusses and analyzes the nature and meaning of culture, the role of culture in personality formation, culture and anxiety, anthropological approaches to the "normal" and the "abnormal," and the question, "Is mental illness psychological fact or cultural fiction?"

SOA 1275 Musical Culture: Notes in the Modern World 4 QH

Explores issues of class, ethnicity, gender, sexuality, and age in the cross-cultural context of music as expressed in performances, recordings, videos, literary, and ethnographic materials. The course will also examine the social production and consumption of music. Expects students to conduct a series of field exercises.

SOA 1301 Human Origins 4 QH

Offers an intensive look at the data on fossil remains and contemporary primates, which are essential for an understanding of human physical and behavioral evolution. Efforts are made to bring the student into direct contact with primary materials. (II)

SOA 1303 Sexuality and Culture 4 QH

Examines sexuality in a cross-cultural perspective including issues of sexual identity, the relationship of sexuality to the life cycle, sexual ideologies, and the links between sexuality and the reproduction of cultural norms. Topics include cross-cultural variation in sexual expression, sex and reproduction as commodities, sexuality and violence, sexually transmitted diseases and social policy. Compares sexuality issues in the United States to those of other cultures.

SOA 1310 Global Markets and Local Cultures 4 QH

Discusses selected topics in the socioeconomic transformation of other cultures, including urbanization, industrialization, commodity production, and international labor migration. Focuses on the impact of capitalist development on contemporary third world and postcolonial societies; examines local responses to those changes.

SOA 1320 Anthropology Methods 4 QH

Examines theory and practice of methods of field research and data analysis. Gives students the opportunity to take part in a field project.

SOA 1335 Language and Culture 4 QH

Focuses on the anthropological study of linguistics. Presents basic theories of sociolinguistics and explores language in its social context. Includes animal communication; language learning; language and mind; cognitive and symbolic anthropology; the ethnography of speaking, speech, and boundaries; multilingualism; language and gender; language and ethnicity; language and social class; and pidgins and Creoles. Includes several field assignments.

SOA 1345 People in Cities 4 QH

Studies urban life and urban problems, using international case studies. Addresses rural/urban and international migration, the relationship of urban settlement to employment patterns, the creation of inner-city or suburban ghettos or squatter settlements, and movements for city services in areas of spontaneous growth. Gives students the chance to design and implement a field project.

SOA 1425 Cultural Survival 4 QH

Examines the problems faced by today's tribal peoples and national minorities. Using cross-cultural case studies, analyzes the relationship of governmental policies and economic development priorities to the survival of self-identified tribal cultures and minority populations throughout the world. Examines human rights, nationalism, and cultural autonomy, resistance, and self-determination.

SOA 1430 Latin American Society and Development 4 QH

Explores the processes of social, economic, and cultural change in Latin America. While concentrating on the present, traces class formation, agrarian structures, ethnic identity, ceremonial organization, gender roles, and political conflict since the colonial era in a range of countries. Emphasizes the relationship of communities and national political and economic systems. May emphasize Central America and Mexico or countries in South America through case studies. (IV)

SOA 1431 Native North Americans 4 QH

Explores North American Indian tribes including the Dakota (Sioux), Navajo, Pueblo, Mohawk, and Penobscot, and examines the historical changes that led to their contemporary situation. Focuses on the reservation and its many problems from various viewpoints.

SOA 1470 Religion and Myth 4 QH

Focuses on nature and institutionalization of primitive, ancient, and contemporary religions. Explores religious concepts and movements in relation to social, religious, and political organization.

SOA 1704 Cultures of the World (Honors) 4 QH

Honors equivalent of SOA 1104.

SOA 1800, SOA 1801 Directed Study 4 QH each

Offers independent work on a chosen topic under the direction of members of the department. *Prereq.* Senior standing and department approval.

SOA 1820, SOA 1821, SOA 1822, SOA 1823 4 QH each
Junior/Senior Honors Project

For details contact the honors office.

SOA 3100 Theory 4 QH

Graduate school course open to qualified undergraduates with permission of instructor.

Art and Architecture

ART 1100 History of Art to 1400 4 QH

Provides a survey of Western art from prehistoric times to the Renaissance.

ART 1101 History of Art Since 1400 4 QH

Surveys Western art from the Renaissance to the twentieth century.

ART 1106 Introduction to Art 4 QH

Offers an introduction to the characteristics of the visual arts, including painting, sculpture, graphic arts, and architecture. Studies various examples of works of art as an introduction to style and technique. Includes visits to museum collections and contemporary art galleries. (II)

- ART 1111 Introduction to Architecture** 4 QH
Introduces the history, theory, and practice of architecture. Shows how architects in different historical periods have balanced the demands of function, construction and aesthetics. Concentrates on specific design problems found in churches, houses, skyscrapers, and cities.
- ART 1124 Basic Drawing** 4 QH
Offers intensive drawing instruction. Focuses on developing a formal understanding of the structure of objects and figures as well as increased dexterity with a variety of drawing tools. Includes experiments with materials such as wash, charcoal, and pencil.
- ART 1127 Basic Painting** 4 QH
Presents an introductory studio course in the fundamental techniques of painting. Formal problems in the study of color, light, space systems, form, and composition establish the foundation for more individual creative expression. Uses critiques and slide lectures as needed.
- ART 1130 Visual Studies Foundation 1** 4 QH
Offers an introductory lecture/studio course clarifying basic principles, language, and concepts inherent in visual language systems. Concentrates on two-dimensional media including photography, painting, video, and film as related to the fundamentals of composition, space relationships, effects of color, form, pattern repetition, structure, figure-ground relationships, balance, and unity.
- ART 1131 Visual Studies Foundation 2** 4 QH
Explores three-dimensional form. Examines principles including mass, volume, line, plane, and texture. Introduces basic materials and structure through constructing models and prototypes. Presents sequential exercises with simple eye/hand skills and form recognition. Explores complex projects that require an understanding of context, content, and developing original forms. *Prereq. ART 1124 and ART 1130.*
- ART 1132 Principles of Graphics** 4 QH
Offers intensive study in graphic form principles through assigned problems, critiques, and lectures that emphasize formal and conceptual understanding. Develops the visual problem-solving process including comprehending problem objectives, working to specifications, investigating alternatives, and presenting professionally crafted solutions. *Prereq. ART 1130 or permission of instructor.*
- ART 1133 Graphic Design 1** 4 QH
Introduces applied graphic design. Explores photographic image making and manipulation, as well as letterform and type, as approaches to visual problem-solving. Emphasizes formal relationships and investigates concept development through sequence and series. Refers to visual books, graphic system, and moving images. *Prereq. ART 1132, ART 1134, and ART 1160.*
- ART 1134 Typography 1** 4 QH
Introduces letterforms in visual communication. Studies typography as form, typographic contrast principles, text organization and hierarchy, the typographic grid, legibility, and letterspacing. Explores the history and variety of typefaces. Includes assigned projects, readings, and lectures. *Prereq. ART 1130 or permission of instructor.*
- ART 1144 Typography 2** 4 QH
Builds on the letterform, typography, and grid studies begun in ART 1134 and applies them in a series of projects that focus on text type, legibility, readability, structure, and contrast in publication design and in typographic approaches to information design. *Prereq. ART 1134.*
- ART 1150 Architectural Design 1** 4 QH
Introduces conceptual thinking about the design of the built environment. Recent studio work has included analyses of seminal modern houses, design projects for memorials, idea-based houses, and the urban landscape. Focuses on integrating imagination into solving these design problems. *Prereq. ART 1156 or GE 1103.*
- ART 1151 Architectural Design 2** 4 QH
Introduces the structure and order of architectural thinking. Includes projects such as compositional exercises, formal analysis, and additions to important modern buildings. Studies the analytical tools for understanding the relationship of building elements to the ideas that inform them. *Prereq. ART 1150.*
- ART 1156 Architectural Drafting** 4 QH
Introduces architectural drafting techniques, tools, materials, lettering, and dimensioning. Students will be expected to make orthographic, axiometric, one- and two-point perspective drawings. *Prereq. ART 1124.*
- ART 1160 Introduction to Photography** 4 QH
Explores the basics of black and white photography. Introduces the 35mm camera, negative processing, and black and white printing in the department's state-of-the-art lab. No camera nor previous photography experience required.
- ART 1170 Filmmaking Workshop** 4 QH
Introduces students to the nature and creative uses of video. Examines video's technological foundation, conventions, and aesthetic potential. Emphasizes weekly hands-on lab assignments and substantive final project. Includes lectures, screenings, and critiques. Facilities and equipment are provided by the department.
- ART 1180 Video Basics** 4 QH
Introduces the fundamental nature of the video medium and its creative use. Examines the technological foundation of video, the established conventions of effective field and studio production techniques and postproduction techniques (electronic editing), and explores the aesthetic potential of both the visual and auditory aspects of video. Emphasizes weekly hands-on lab assignments with a final substantive video project required of each student. Facilities and equipment are provided.
- ART 1190 Introduction to Computer Graphics** 4 QH
Introduces visual problemsolving with computers. Emphasizes the medium's special properties and its potential. *Prereq. ART 1130 and ART 1131 or permission of instructor.*
- ART 1203 Medieval Architecture** 4 QH
Studies the major religious and secular buildings of the Early Christian, Byzantine, and Gothic periods, emphasizing Gothic architecture of France and England.
- ART 1204 Renaissance Architecture** 4 QH
Focuses on architecture and urban form in Italy between 1400 and 1600, with some emphasis on Renaissance architecture in France and England.

- ART 1205 Renaissance Art** 4 QH
Examines Italian painting and sculpture from the early fourteenth century to the end of the sixteenth century, with emphasis on the art of the great painters and sculptors of the period such as Botticelli, Donatello, Leonardo, Michelangelo, and Titian. The art will be considered in the context of the social, political, philosophical, and religious issues of the time. (III)
- ART 1210 Nineteenth Century Painting** 4 QH
Examines European painting and related arts including the neo-classical, romantic, realist, and impressionist movements. Emphasizes French painting, but also considers important developments in England and other western European countries. (III)
- ART 1213 Modern Art** 4 QH
Traces the development of painting, sculpture, and related arts from European avant-garde in the late nineteenth century to the international market of the late twentieth century. Topics include challenges to traditional boundaries between media, the development of abstraction and the idea of pure form, and the recent emergence of a post-modern aesthetic.
- ART 1216/AFR 1200 Survey of African Art** 4 QH
Traces the historical development of African art from traditional to contemporary styles and periods. Emphasizes the study of art objects, the social and historical context in which aesthetic issues are shaped, and the impact of religion and external forces on creativity. Uses lectures, critique, discussions, fieldwork, and hands-on interaction with art objects.
- ART 1218/AFR 1151 African-American Art History** 4 QH
Offers a historical and critical examination of African-American art from the nineteenth century to the present, with special emphasis on the effects of European and African art styles on the black artist in America.
- ART 1220 American Art** 4 QH
Surveys the history of American painting and sculpture from the seventeenth century to the present. Focuses on the cultural forces that shape the evolution of art in America. Includes frequent museum visits. (III)
- ART 1223 American Architecture** 4 QH
Introduces American architecture, town planning, and urban design from the 1700s to the 1930s. Considers European influences and uniquely American contributions. (III)
- ART 1225 Modern Architecture: The Nineteenth Century** 4 QH
Surveys the development of modern architecture in England, France, Germany, and the United States from the mid-eighteenth to the late nineteenth century. Discusses architecture and urban design as a cultural response to society's changing conditions. Considers such themes as symbolism, morality, rationalism, and functionalism. *Prereq.* ART 1111 or permission of instructor.
- ART 1226 Modern Architecture: The Twentieth Century** 4 QH
Examines the forms and principles of European and American architecture of the twentieth century, emphasizing the work of such key figures as Frank Lloyd Wright, Mies van der Rohe, Le Corbusier, and Louis Kahn; and such influential movements as the Dutch de Stijl, Russian constructivism, and American post-modernism.
- ART 1230 History of Photography** 4 QH
Explores photography from its origins in the early nineteenth century to its maturity in the mid-twentieth century. Surveys technological developments but emphasizes the emergence of photography as an expressive medium and its relation to other modern art forms.
- ART 1233 Contemporary Directions in Photography** 4 QH
Studies prevailing trends in photographic artistic expression from the beginning of the twentieth century to the present. Examines the importance of photographic imagery in relation to our surroundings through lecture and slide presentations.
- ART 1235 History of Film** 4 QH
Surveys major international developments in film from the late nineteenth century to the present. Examines national movements, technological and aesthetic innovations, important figures, and significant films. Includes films, lectures, and discussions.
- ART 1236 American Film** 4 QH
Surveys the rise of the American film from the late nineteenth century to the present. Examines key films, directors, major themes, and film forms and techniques. Includes lectures, screenings, and discussions.
- ART 1237 Contemporary Directions in Cinema** 4 QH
Provides a comparative study of major international film movements from World War II to the present. Studies selected films by representative contemporary directors. Includes lectures, screenings, and discussions.
- ART 1240 History of Graphic Design** 4 QH
Considers the history, context, and issues of graphic design through lectures, readings, discussions, and projects. *Prereq.* ART 1101.
- ART 1243 Graphic Design 2** 4 QH
Investigates the expressive visual potential of words and images. Explores visual poetry, the connotations of mark and form choice, and applied semiotics. Includes assigned projects, readings, discussions, and lectures. *Prereq.* ART 1133 and ART 1250.
- ART 1244 Graphic Design 3** 4 QH
Introduces problem-solving methodologies and applies them to complex communications problems. Uses research, teamwork, and brainstorming to define the problems, and develops and formally refines the solutions. *Prereq.* ART 1243.
- ART 1250 Color Theory and Practice** 4 QH
Focuses on the optical phenomena of color and their application in visual communication. Studies hue, value, and saturation, and their implications for color activity, legibility, and spatial illusion in traditional and electronic media.
- ART 1252 Architectural Design 3** 4 QH
Addresses the issue of building typology. Offers students the opportunity to learn to use, as models in their own work, the formal, organizational, and cultural similarities of buildings from throughout history with similar uses. Gives meaning to the study of architectural history and allows history to inform the current design process. *Prereq.* ART 1151.

ART 1253 Architectural Design 4**4 QH**

Studies the effect of external circumstance on the architectural process. In addition to studying historical urbanism, students will work with ideas about landscape and aesthetic frameworks that can govern projects from without. Projects are studied at several scales, from the aerial map to the building detail. *Prereq.* ART 1252.

ART 1254 Intermediate Drawing**4 QH**

Focuses on heightening the student's understanding of spatial awareness, scale movement, and expression. Students will be asked to create unusual environmental situations for their figurative compositions. A variety of media will be used, including wash, pen and ink, watercolor, chalk, charcoal, and pencil. *Prereq.* ART 1124 or *equiv.*

ART 1256 Theory of Structures 1**4 QH**

Introduces the theory of materials and structures. Examines basic structural elements in masonry and wood construction. Uses historic and current building types to explore the relationship between structure, materials, construction process, and architectural space. Includes lectures, discussions, field trips, and student presentation of structural models and diagrams. *Prereq.* PHY 1222.

ART 1257 Theory of Structures 2**4 QH**

Continues ART 1256, combining the basic structural elements to develop structural systems. Explores form, stability loading, and materials in relation to the design of foundation, structural steel, reinforced concrete, timber, frame, space frame, and shell systems. *Prereq.* ART 1256 and PHY 1222.

ART 1261 Intermediate Black and White Photography**4 QH**

Emphasizes combining personal aesthetic choices with refined darkroom skills. A second-level black and white photography studio/lab course. The zone system for roll film cameras, toners, fiber based papers and alternative film choices will be demonstrated and assigned. A final portfolio is required for successful completion of the course. Lab fee. *Prereq.* ART 1160 or *equivalent*.

ART 1263 Introduction to Color Photography**4 QH**

Introduces shooting, processing, and printing color negative films. Lectures cover basic color theory in relationship to photography as well as contemporary color photographic processes. Working with color negative films, students get hands-on experience in the C-41 process for developing film and the EP-2 process for printing color negatives. Weekly assignments emphasize solving technical and aesthetic problems inherent in dealing with color negative materials. Hands-on labs allow students to produce final projects. Color chemistry and facilities are provided. *Prereq.* ART 1160 or *equivalent*.

ART 1264 Color Photography 2**4 QH**

Allows students to explore and develop their personal photographic style with an emphasis on experimentation. A second-level color course. Studies historical perspective of color photography contrasted with contemporary color work. Offers students the opportunity to develop the necessary foundation for critical analysis of their own work through required reading. Includes weekly assignments and critiques. Students will develop a cohesive portfolio of photographs. *Prereq.* ART 1263.

ART 1280 Media Graphics**4 QH**

Offers applied video design projects. Develops visual logic, sequence, motion, and legibility. Includes assignments, demonstrations, and lectures. *Prereq.* ART 1180 and ART 1243.

ART 1281 Video Project**4 QH**

Offers in-depth exploration of the video medium. Students research, write, and produce a documentary, fictional narrative, or experimental video project. Emphasizes innovation, personal authorship, effective research, sound conceptual development, formal and technical skills, and imaginative and creative soundtracks and visuals in video. *Prereq.* ART 1180 or *equivalent*.

ART 1285 Interarts**4 QH**

Introduces the dynamics of interdisciplinary art in a team-taught course. Interarts presents contemporary art forms existing outside the established traditions of fine arts. Art concepts investigated include time, systems, kinetics, environments, phenomenology, politics, and collaborations. A hands-on, project-oriented course where upper level students work in small groups to explore the interrelationships of media utilizing light, sound and video within installation, performances, dances, and events. Exposes students to a range of contemporary subjects through video/slide presentations, live performances, selected readings, and lectures by visiting artists. *Prereq.* ART 1124, ART 1130, ART 1131 or *permission of instructor*.

ART 1290 Electronic Publishing Design**4 QH**

Investigates publication and periodical design issues including concept development, sequence, organization, page design, typography, and the typographic grid. Includes assignments using page layout software in the computer labs. *Prereq.* ART 1132, ART 1134, and ART 1190 or *equivalent*.

ART 1291 Intermediate Computer Graphics Workshop**4 QH**

Offers the opportunity to pursue individual projects and assigned studies in the computer environment. *Prereq.* ART 1190 and ART 1243 or *permission of instructor*.

ART 1295 Computer-Aided Design**4 QH**

Introduces CAD processes for two- and three-dimensional modeling for architectural design. Studies computer-aided design techniques that support site and program analysis concept and schematic design, and design development and construction drawing applications. *Prereq.* ART 1190 or *equivalent*.

ART 1296 Advanced Studio in Computer Visualization**4 QH**

Continues ART 1295. Offers detailed, hands-on instruction in computer modeling and rendering. Offers students the opportunity to learn to manipulate two-dimensional, three-dimensional, and video images using IBM computers and AutoCAD. Includes topics such as ray tracing, solid modeling, and image synthesis. *Prereq.* ART 1295.

ART 1310 Seminar in Modern Architecture**4 QH**

Explores contemporary issues in architectural theory, design, and practice. Examines historical forces and contemporary criticism to define the nature of modernism and post-modernism. Focuses on such architects as Louis Kahn, IM Pei, Philip Johnson, Robert Venturi and Denise Scott-Brown, Michael Graves, and Frank Gehry. *Prereq.* ART 1226 or *permission of instructor*.

ART 1324 Thesis in Art History**4 QH**

Focuses on the production of a 20–30 page thesis. Students undertake individual research, under the direction of a faculty member, on art-historical topics appropriate to their personal and professional interests. Conceived for art majors who are completing the BA degree and whose primary interest is in art history. *Prereq.* ART 1100, ART 1101, 20 QH in other art history courses, *departmental permission*.

ART 1330 Advanced Visual Communication**4 QH**

Presents an advanced interdisciplinary studio seminar in visual and media design. In a chosen area of specialization, students explore their capabilities through the practical application of conceptual and technical skills. Lab fee. *Prereq.* ART 1144 and ART 1244 or permission of instructor.

ART 1341 Architectural Design 5**6 QH**

Studies the construction and fabrication process. Students will have the opportunity to study the impact of these processes on their thinking as designers. Explores the relationship between schematic ideas and materials and their connections. Projects include detailed drawings and large scale models. *Prereq.* ART 1253.

ART 1342 Architectural Design 6**6 QH**

Requires students to integrate previously acquired knowledge in the resolution of a specific building program for a specific site. Provides students with the opportunity to investigate the relationship between the different aspects of design and how it leads to the resolution of architectural forms. Incorporates the issues of context, tectonics, and typology into the design of a single building. *Prereq.* ART 1341.

ART 1352 Architectural Thesis**6 QH**

The final studio course. Adds the element of problem identification to problem solving already covered in the previous architectural design studio sequence. Each student must frame his or her own architectural problem and then formulate a response to that problem. Students are expected to arrive with a project proposal over the first two weeks and spend the remainder of the term developing the project. *Prereq.* ART 1342.

ART 1355 Environmental Systems**4 QH**

Surveys the environmental systems of power, air, water, waste, and light as integral elements of architecture. Discusses the theory and practice of these systems in architectural design. Considers historical and contemporary examples of building systems that illustrate the function, technology, and aesthetics of environmental systems. Includes field trips, lectures, and individual student research projects. *Prereq.* ART 1252 or permission of instructor.

ART 1363 Advanced Photography Seminar**4 QH**

Provides close interaction between student and teacher. Students are asked to refine their technical skills and to make meaningful decisions about their relationship to the world around them through the use of black and white and/or color photography. Portfolio preparation, alternative processes, and large format will be combined to form a base of skills with which to present the student's work to a larger photographic community. Stresses individual direction and a qualitative approach to substantive photography. *Prereq.* Permission of instructor.

ART 1713 Modern Art (Honors)**4 QH**

Combines in-depth investigation of selected modern artists and movements with an overview of the diverse meanings and functions of modern art. Involves developing and presenting individual research projects. *Prereq.* Honors status or permission of instructor.

ART 1800, ART 1801, ART 1802 Directed Study**4 QH each**

Offers independent work under the direction of members of the department on a chosen topic. *Prereq.* Junior or senior art major and department approval.

ART 1803, ART 1804, ART 1805 Directed Study**6 QH each**

Offers independent work under the direction of members of the department on a chosen topic. *Prereq.* Junior or senior art major and department approval.

ART 1810, ART 1811, ART 1812, ART 1813**4 QH each****Junior/Senior Honors Program**

For details contact the honors office.

Biology

Courses are presented in three categories: non-science majors; health-related science and other non-biology science majors; and biology majors. Two or more courses with substantially the same content may not be counted toward quantitative graduation requirements. If a student is not sure whether particular courses overlap it is his/her responsibility to get advice from a departmental advisor.

The following courses are primarily for non-science majors. These courses are not open to biology majors.

BIO 1111 Environment and Man**4 QH**

Offers an ecological analysis of man's interaction with other organisms. Presents the necessary foundation of biological principles. (II)

BIO 1171 Focus on the Sea: Issues and Nature**2 QH**

Explores marine conservation issues through lectures, discussion, and field trips to coastal habitats and islands. Studies the sea from ecological, economic, and literary perspectives.

BIO 1175 Introduction to Marine Biology**4 QH**

Offers a broad introduction to the field emphasizing principles of oceanography and marine biology. Presents the physical, geological, and biological aspects of the ocean. Discusses the diversity of marine life and how organisms interact within different marine communities. Lab fee.

BIO 1181 The Human Organism**4 QH**

Introduces the structure and function of the human body. Emphasizes the principles of biological and physical science as they relate to life processes in health and disease. Lab experiments explore the workings of the students' own biological systems rather than those of other animals. Lab fee.

BIO 1187 Biology of Human Reproduction**4 QH**

Studies the sexual and reproductive function in the human male and female, including sexual development, coitus, fertilization, pregnancy, birth, and lactation. Discusses the methods of controlling fertility and sexually-transmitted disease. Analyzes factors affecting reproduction and sexuality in various human populations.

The following courses are primarily for majors in science- or health-related professions. These courses, where indicated, are not open to biology majors.

BIO 1106 General Biology**4 QH**

Focuses on universal properties and processes of living organisms. Topics include cellular composition and cellular control, heredity, the evolutionary process, and environmental relationships. Lab fee. (Overlaps BIO 1103 and BIO 1140.)

BIO 1107 Animal Biology**4 QH**

Offers a systematic comparative study of the structure and functions of animals. Considers the diversity of animals from the standpoint of evolutionary adaptation. Lab fee. (Overlaps BIO 1104 and BIO 1141.) *Prereq.* BIO 1106.

BIO 1120 Basic Microbiology**4 QH**

Microbial life, emphasizing morphological characteristics, physiological activities, and disease production. Lab fee. (Overlaps BIO 1320 and BIO 1121.) *Prereq.* BIO 1140, or permission of instructor; not open to biology majors.

BIO 1121 Introductory Microbiology**3 QH**

Same as BIO 1120, but without lab. *Not open to biology majors.*

BIO 1140 Basic Animal Biology 1**4 QH**

Covers principles of biology; universal properties and processes of living organisms as exemplified by the cell and its activities, inheritance, evolution, and environmental relationships. Lab fee. (Overlaps BIO 1103 and BIO 1106.)

BIO 1141 Basic Animal Biology 2**4 QH**

Offers systematic, comparative study of the structure and functions of animals. Considers the diversity of animals from the standpoint of evolutionary adaptation. Lab fee. (Overlaps BIO 1104 and BIO 1107.) *Prereq.* BIO 1140.

BIO 1150 Functional Human Anatomy and Physiology 1**5 QH**

Covers cell and tissue structure and function, anatomical terminology, and the anatomy and physiology of bones, muscles, and the nervous system. Lab includes the study of human bones and muscles, pig dissection, and muscle and nerve physiology. Lab fee. (Overlaps BIO 1152.) *Not open to biology majors.*

BIO 1151 Functional Human Anatomy and Physiology 2**5 QH**

Covers anatomy and physiology of the respiratory, digestive, urogenital, endocrine, and cardiovascular systems, and a brief exploration of the anatomy and physiology of the eye and ear. Lab includes studies of sensory physiology, enzymes, metabolism, and cardiovascular, respiratory, and urinary function. Lab fee. (Overlaps BIO 1153 and BIO 1154.) *Prereq.* BIO 1150; not open to biology majors.

BIO 1152 Integrated Human Anatomy and Physiology 1**4 QH**

Introduces students to human anatomy and physiology. Focuses on cell and tissue structure and function; and anatomy and physiology of skin, bones, muscles, and blood. Lab includes pig dissection. Lab fee. (Overlaps BIO 1150.) *Not open to biology majors.*

BIO 1153 Integrated Human Anatomy and Physiology 2**4 QH**

Presents the structure and function of the following systems: nervous, endocrine, and reproductive. Lab includes pig dissection. Lab fee. (Overlaps BIO 1151.) *Prereq.* BIO 1152; not open to biology majors.

BIO 1154 Integrated Human Anatomy and Physiology 3**4 QH**

Presents the structure and function of the cardiovascular, respiratory, urinary, and digestive systems and the regulation of metabolism and body temperature. Lab includes pig dissection. Lab fee. (Overlaps BIO 1151.) *Prereq.* BIO 1153; not open to biology majors.

The following courses are primarily for biology majors but are open to other students with appropriate prerequisites and permission of the instructor.

BIO 1103 Principles of Biology 1**5 QH**

Introduces basic biological principles. Topics include: the first human retrovirus; the nature of scientific thought and knowledge; launching the antibiotic era; diabetes and the discovery of insulin; the cellular pathway of insulin secretion; DNA science; the principles of inheritance, and others. Integrates topics into discussions of disease and pathological processes and how fundamental biological principles form the foundation of medical science. Lab involves demonstrations and hands-on practice of the concepts discussed in lecture. Lab fee.

BIO 1104 Principles of Biology 2**5 QH**

Introduces the diversity of animals through presentation of their systematic relationships, structure and function, and ecological roles. Cellular, tissue, and organismal levels are included. Supplemented with laboratory observations. Lab fee. *Prereq.* BIO 1103.

BIO 1105 Principles of Biology 3**5 QH**

Examines the biology and diversity of plants and plant-like organisms. Explores the relationships between humans and plants by looking at plants through three different perspectives: 1) Feeding a Starving World; 2) Curing a Sick World; and 3) Engineering a Better World. Employs case studies to highlight major themes. Lab involves demonstrations and hands-on practice of the concepts discussed in the lecture. Lab fee. *Prereq.* BIO 1103 or BIO 1106.

BIO 1212 Environmental and Population Biology**5 QH**

Considers physical and chemical factors of the environment as they affect the distribution of organisms and as they may in turn be affected by the organisms. Includes population dynamics, species interactions, population genetics (lightly), the development of communities, and the structure and function of ecosystems. Lab fee. *Prereq.* BIO 1105, BIO 1107 or BIO 1103, BIO 1105, and CHM 1111.

BIO 1270 Diving Research Methods**4 QH**

Introduces students to techniques in the study, ecology, and physiology of subtidal marine organisms. Focuses on underwater research methods, their appropriate applications, and their implementation during field exercises under water. Topics to be covered include diving physiology, sampling design, experimental design, statistical analysis of data, population censusing methods, under water measurements of hydrodynamics, in situ respirometry, underwater telemetry, underwater photography, and the use of underwater habitats and submersibles in research. Lab fee. *Prereq.* Scuba certification.

BIO 1280 Genetics**5 QH**

Focuses on classical and molecular approaches to understanding heredity. Topics include Mendelian genetics, linkage, recombination, gene mapping, chromosomal genetics, molecular genetics, recombinant DNA methods, gene regulation, and developmental genetics. Laboratory includes work with *Drosophila*, fungi, bacteria, and DNA plasmids. Lab fee. *Prereq.* BIO 1103–1105 or BIO 1105–1107, and CHM 1264.

BIO 1281 Introductory Biochemistry**5 QH**

Topics include structure and function of biomolecules, central concepts of bioenergetics and thermodynamics, enzyme kinetics and regulation, and metabolic pathways. Lab fee. *Prereq.* BIO 1103–1105 or BIO 1106–1107, and BIO 1280, CHM 1221, and CHM 1265.

BIO 1311 Evolution**4 QH**

Discusses history of evolutionary theory and lines of evidence. Emphasis is placed on mechanisms of speciation. Introduces current evolutionary topics. Laboratory involves students in library research. *Prereq.* BIO 1104 or BIO 1107 and BIO 1212, and BIO 1280.

BIO 1312 Marine Ecology**4 QH**

Studies marine habitats and organisms. Focuses on primary and secondary productivity, and community structure and dynamics. Emphasizes through field work the Pacific Northwest intertidal and shallow subtidal communities. East/West program, Friday Harbor. *Prereq.* Two years of college biology.

BIO 1320 General Microbiology**5 QH**

Introduces morphological, ecological, and biochemical consideration of representative groups of bacteria. Introduces virology and microbial genetics; host-parasite relationships, prokaryotes of medical significance; and physical and chemical controls of microbial growth. (Overlaps BIO 1120.) Lab fee. *Prereq.* BIO 1103, BIO 1105, CHM 1111, and CHM 1122.

BIO 1330 Marine Botany**4 QH**

Explores taxonomy of the major groups of marine plants, primarily algae. Investigates ecological and reproductive strategies, economic importance, and roles in diverse marine communities. Mandatory field trips in addition to lab. Lab fee. *Prereq.* BIO 1103–BIO 1105.

BIO 1332 Molecular Marine Botany**4 QH**

Introduces modern biochemical and molecular approaches used to examine systematic and evolutionary problems at the species level and above. Offers extensive hands-on laboratory experience in isozyme electrophoresis, DNA isolation, and restriction fragment analysis. Expects students to conduct individual projects, applying techniques they have learned to topics dealing with the local seaweed and seagrass flora. Lab fee. *Prereq.* BIO 1330 or permission of instructor.

BIO 1341 Vertebrate Zoology**4 QH**

Presents systematics, behavior, ecology, and zoogeography of all classes of vertebrates. Laboratories consist of study of vertebrate specimens and field trips to observe species in their habitats. Lab fee. *Prereq.* BIO 1104 or BIO 1107.

BIO 1342 Biology of Crustacea**4 QH**

Studies systematics, morphology, and biology of the smaller Crustacea. Focuses on non-malacostracan orders, but includes those malacostracan taxa dominated by small forms. Lab fee. *Prereq.* BIO 1370 or GEO 1428 or permission of instructor.

BIO 1347 Embryology**5 QH**

Topics include gametogenesis, fertilization, cleavage, gastrulation, induction, organogenesis, and metamorphosis in vertebrates. Lab work emphasizes the frog, chick, and pig. Lab fee. *Prereq.* BIO 1107 or BIO 1105, and BIO 1280.

BIO 1348 Animal Histology**4 QH**

Offers microscopic study of fundamental types of animal tissues. Lab fee. *Prereq.* BIO 1104 or BIO 1107.

BIO 1350 Regulatory Cell Physiology**5 QH**

Introduces physiological control systems including transport processes, cellular basis of nerve function, action of chemical

messengers and regulators, and principles of cellular contraction and motility. Lab fee. *Prereq.* BIO 1103 and BIO 1104, or BIO 1106 and BIO 1107.

BIO 1351 Comparative Vertebrate Anatomy**5 QH**

Examines the morphology and phylogeny of the vertebrates. Lab work consists of the dissection of the shark, mud puppy, and the cat. Lab fee. *Prereq.* BIO 1105 or BIO 1107.

BIO 1370 Marine Invertebrate Zoology**5 QH**

Topics include functional morphology, systematics, ecology, and phylogenetic relationships of the major invertebrate phyla. Lab emphasizes utilization of living marine forms, with dissection of representative organisms. Lab fee. *Prereq.* BIO 1105 or BIO 1107.

BIO 1371 Biological Oceanography**4 QH**

Offers labs and lectures encompassing the principles of biological oceanography. Topics include physical and chemical aspects of the ocean environment, the distribution, production, and interactions of marine planktonic organisms, and ecosystem characteristics of specific oceanographic environments. Emphasizes participation in sampling and analysis using current instrumentation and methods. Lab fee. *Prereq.* BIO 1104 or BIO 1107.

BIO 1412 Benthic Marine Ecology**4 QH**

Examines the interactions among bottom-dwelling invertebrates, fish, and plants and their environment. Quantitative field methods and new developments in ecological theory will be applied to examinations of the rocky intertidal zone, soft sediment areas, salt marshes, and the rocky subtidal zone. Lab fee. *Prereq.* BIO 1212; BIO 1370 recommended.

BIO 1413 Tropical Terrestrial Ecosystems**3 QH**

Introduces students to the plants, animals, and ecosystems of terrestrial Jamaica. East/West Program. *Prereq.* Two years of college biology.

BIO 1420 Microbial Physiology**4 QH**

Focuses on structure and function of the bacterial cell, emphasizing its general properties as well as on the physical and chemical factors that influence it. Lab fee. *Prereq.* BIO 1320 or equivalent.

BIO 1427 Medical Microbiology**4 QH**

Emphasizes host-parasite interactions: virulence, toxins, natural flora, immunological responses; characteristics of the common bacterial, rickettsial, and protozoal infections in humans; epidemiology, pathology, vaccines, and chemotherapy. Lab fee. *Prereq.* BIO 1320 or equivalent.

BIO 1430 Plant Physiology**4 QH**

Focuses on the physiology and biochemistry of plants as a whole and at the cellular and organ levels. Considerations of mineral metabolism and nutrition, photosynthesis, hormones, growth, and development are included. Attendance at a weekly four-hour lab, as well as preparation of a paper based on the research literature, is required. Lab fee. *Prereq.* BIO 1105 and CHM 1265.

BIO 1432 Higher Plants**4 QH**

Studies the origin and evolution of land plants since their invasion of the land surface in late Silurian and early Devonian times, approximately 405 to 370 million years ago; compares early and modern land plants and discusses their evolution; examines the flower as a reproductive structure. Lab fee. *Prereq.* BIO 1105.

BIO 1437 Plant Development**4 QH**

Examines the structural and molecular aspects of plant development beginning with the fertilization apparatus of higher plants and the development of the embryonic plant. Studies the structure and development of the vegetative and reproductive organs of the plant. Applies the advances in the fields of cellular and molecular biology to the interpretation of plant development. Students progress from learning fundamental information on each topic through reading contemporary research papers. Student projects will be the focus of the laboratory. Lab fee. *Prereq.* BIO 1105.

BIO 1440 Advanced Invertebrate Zoology**4 QH**

A lecture, field, and lab course that concentrates on one or two phyla. Subject varies from year to year, depending upon expertise of available faculty. An individual research project is required. Lab fee. *Prereq.* Two years of college biology.

BIO 1441 Parasitology**4 QH**

Examines the symbiotic relationships of parasitic protozoans, flatworms, nematodes, and arthropods. Lab fee. *Prereq.* BIO 1107 or BIO 1104, and BIO 1280.

BIO 1442 Vertebrate Paleontology**4 QH**

Examines evolution of the vertebrates, including humans, as revealed through the fossil record. Lab, museum, and field studies. Lab fee. *Prereq.* BIO 1107 or BIO 1105, BIO 1212, BIO 1280; or permission of instructor.

BIO 1444 Wildlife Biology**5 QH**

Presents concepts and techniques utilized in the conservation and study of wild vertebrates in lecture, laboratory, and weekly field trips. Subjects include habitat management, endangered species, exotic species, zoonoses, financing, and legislation. Lab fee. *Prereq.* BIO 1104 or BIO 1107, BIO 1212, and BIO 1341.

BIO 1446 Ornithology**5 QH**

Discusses anatomy, physiology, behavior, ecology, and systematics of birds. Laboratories include study of specimens and field identification. Lab fee. *Prereq.* BIO 1104 or BIO 1107, and BIO 1212.

BIO 1447 Herpetology**4 QH**

Emphasizes the natural history, behavior, systematics, and zoogeography of recent amphibians and reptiles. Lab consists of identification particularly of local species. Mandatory field trips. Lab fee. *Prereq.* BIO 1105 or BIO 1107, and BIO 1280.

BIO 1448 Mammalogy**5 QH**

Discusses anatomy, physiology, behavior, ecology, and systematics of mammals. Laboratories involve study of specimens, field collection, and museum preparation, including a weekend field trip. Lab fee. *Prereq.* BIO 1104 or BIO 1107, and BIO 1212.

BIO 1449 Marine Birds and Mammals**4 QH**

Focuses on the phylogeny, systematics, zoogeography, morphology, physiology, reproduction, behavior, and ecology of birds and mammals associated with the marine environment, with lab emphasis on species that occur along the New England coast. Labs include identifying, dissecting, and preparing specimens. Lab fee. *Prereq.* BIO 1212 and BIO 1341.

BIO 1450 Immunology**4 QH**

Provides an overview of the structure and function of genes, proteins, and cells involved in the generation of the immune response. Emphasizes molecular immunology and immunogenetics. *Prereq.* BIO 1281. Take concurrently with BIO 1467.

BIO 1453 General Physiology of Invertebrates**4 QH**

Surveys basic animal functions as manifested among the major groups of invertebrates, with comparisons to the vertebrates, especially aquatic vertebrates. Considers the cellular and biochemical bases for the functions, their control, their adaptiveness to diverse environments, and their evolutionary implications. Topics usually include respiration, circulation, nutrition, metabolism, excretion, salt and water balance, temperature responses, biological clocks, sensory organs, and various effector organs. Lab fee. *Prereq.* BIO 1281 or BIO 1350.

BIO 1454 Systems Physiology**4 QH**

Covers function and regulation of major physiological systems in animals including energy metabolism, thermoregulation, muscle and movement, circulation, respiration, salt and water balance, and circadian rhythms. Emphasizes vertebrates but material on invertebrates will be included where appropriate. Lab fee. *Prereq.* BIO 1280 or BIO 1350 or permission of instructor.

BIO 1457 Neuroethology**4 QH**

Concentrates on the mechanisms underlying behavior of model invertebrates and lower invertebrates in a lecture, field, and lab course. Aims to develop a framework to explain behavior in terms of properties and connectivity of neuronal circuits. Topics include: the cellular biology of neurons and neuronal circuits, the organization of sensory and motor systems, and field and lab analysis of simple behaviors. Lab fee. *Prereq.* BIO 1105.

BIO 1460 Current Concepts in Cell Biology**4 QH**

Examines selected topics in cellular structure and function of eukaryotes, for example, compartmentalization and its underlying physical and biochemical processes. Topics will vary. Lab fee. *Prereq.* BIO 1281.

BIO 1461 General Biochemistry**4 QH**

Surveys biochemistry, emphasizing protein structure, the nature of enzymic catalysis, bioenergetics, and the metabolism of carbohydrates, lipids, nucleotides, and amino acids. *Prereq.* BIO 1280 and organic chemistry.

BIO 1462 General Biochemistry Laboratory**4 QH**

Introduces modern research techniques used in biochemistry and molecular biology. Topics include purification and characterization of proteins, kinetic properties of enzymes, isolation of high molecular weight DNA, recombination of DNA molecules in vitro, isolation of bacterial clones containing recombinant molecules, and in vitro mutagenesis. Covers safety and moral concerns raised by genetic engineering. Includes two lab periods and one lecture per week. Lab fee. *Prereq.* BIO 1281 or concurrent with BIO 1461.

BIO 1463 Cellular Biochemistry 3**4 QH**

Emphasizes the structure and function of organelles, mechanisms of signal transduction, and regulation of gene expression. *Prereq.* BIO 1281 or BIO 1461.

BIO 1467 Molecular Biology**4 QH**

Studies current theories of the detailed molecular mechanisms for the preservation, expression, and evolutionary development of biological information. Emphasizes experimental design and proof in macromolecular chemistry and genetics. *Prereq.* BIO 1281 or BIO 1461.

BIO 1470 Ocean and Coastal Processes 1**4 QH**

Includes studies of the open ocean, rocky intertidal areas, sandy beaches, and estuarine environments of the Washington coast. Demonstrates basic biological principles through comparative studies. The first of a series of three courses intended to introduce the student to a wide range of coastal environments. East/West Program, Friday Harbor. *Prereq.* Two years of college biology.

BIO 1471 Ocean and Coastal Processes 2**4 QH**

Includes studies of the open ocean, rocky intertidal areas, sandy beaches, and estuarine environments of the Caribbean. Demonstrates basic biological principles through comparative studies. The second of a series of three courses intended to introduce the student to a wide range of coastal environments. East/West Program, Jamaica. *Prereq.* Two years of college biology.

BIO 1472 Ocean and Coastal Processes 3**4 QH**

Includes studies of the open ocean, rocky intertidal areas, sandy beaches, and estuarine environments of the New England coast. Demonstrates basic biological principles through comparative studies. The third of a series of three courses intended to introduce the student to a wide range of coastal environments. Offered at Marine Science Center in Nahant. *Prereq.* Two years of college biology.

BIO 1475 Biology and Ecology of Fish**4 QH**

Examines the ecology, evolution, systematics, and behavior of fish. Uses field study, lectures, and labs. Studies specimens taken from New England waters. Lab fee. *Prereq.* Two years of college biology.

BIO 1477 The Biology of Corals**5 QH**

Concentrates on tropical cnidaria in a field, lecture, and lab course. The course will study the systematics, anatomy, physiology, and ecology of this group of animals which assume such an important role in tropical marine ecosystems. East/West Program, Jamaica. *Prereq.* Two years of college biology.

BIO 1478 The Biology of Fishes**5 QH**

Examines the systematics, anatomy, behavior and ecology of fish with emphasis on tropical forms. *Prereq.* Two years of college biology.

BIO 1479 Adaptations of Aquatic Organisms**4 QH**

Explores aquatic organisms through a study of their evolutionary responses to the aquatic habitat. Considers the physical properties of water that have affected form, function, and behavior of all aquatic organisms. Uses density, viscosity, diffusion rates, pressure effects, and elementary fluid mechanics to explain such characteristics as the body shape of larvae, hearing and sound production, suspension feeding, and buoyancy. Course includes lectures, labs, demonstrations, and individual research projects. Offered at Marine Science Center in Nahant. *Prereq.* Two years of college biology.

BIO 1480 Senior Biochemistry Seminar**1 QH**

Examines recent developments in various topics of biochemistry. Emphasizes student presentation and analysis. *Prereq.* BIO 1103 through BIO 1281 or BIO 1463.

BIO 1490 Senior Seminar**1 QH**

Examines recent developments in various topics of zoology, microbiology, physiology, botany, ecology, genetics, and cell biology. Emphasizes student presentation and analysis. Limited

to qualified juniors and seniors in the BA program and required of seniors in the BS program. *Prereq.* BIO 1103 through BIO 1281.

BIO 1491, BIO 1492 Directed Study 1, 2**2 QH each**

Offers independent work on a chosen topic under the direction of department faculty. Limited to qualified juniors and seniors with approval of the department and special arrangements with the supervising faculty member. The two quarters of this course together count as one biology department elective. *Prereq.* BIO 1103 through BIO 1281.

BIO 1495, BIO 1496, BIO 1497, BIO 1498**4 QH each****Junior/Senior Honors Project**

For details contact the honors office.

Chemistry

Introductory Chemistry Courses

CHM 1100 Chemistry for Managers in a High-Tech World**4 QH**

Examines fundamentals and applications of chemistry of particular interest to students in business. Discusses atomic theory, chemical bonding and reactions, states of matter and common chemicals, and foundations of organic chemistry. Makes applications to plastics and polymers, biochemistry, semiconductors, and nuclear power.

CHM 1104 Environmental Chemistry**4 QH**

Presents the principles of chemistry: molecular structure and reactivity, stoichiometry, equilibrium, and kinetics in the context of environmental issues including global warming, acid rain, aquatic chemistry, and ozone depletion.

CHM 1105 General Chemistry for the Health Sciences 1**5 QH**

Examines topics in inorganic chemistry relevant to students in the health sciences. Topics include atomic structure; energy changes in physical and chemical processes; stoichiometry; chemical bonding; gases, liquids, and solids; solutions; acids and bases; equilibrium, and kinetics. Topics are related to molecular processes in the human body. Lab fee.

CHM 1106 General Chemistry for the Health Sciences 2**5 QH**

Introduces organic chemistry and organic substances of biological significance. Covers structure and reactivity of alkanes, alkenes, alkynes, aromatic compounds, oxygen containing compounds (alcohols, aldehydes, ketones, esters, ethers, and carboxylic acids), sulfur containing compounds (thiols and sulfides), nitrogen containing compounds (amines and amides), carbohydrates, proteins, lipids, and nucleic acids. Biological chemistry includes the study of enzymes, vitamins, metabolic pathways, and body fluids. Lab fee. *Prereq.* CHM 1105.

CHM 1111 General Chemistry for the Life Sciences 1**5 QH**

Designed for nonchemistry majors. Focuses on basic concepts and definitions: the mole concept and chemical stoichiometry, states of matter, solutions, periodicity of elements, atomic structure, and chemical bonding and reactions. Lab fee. (II)

CHM 1122 General Chemistry for the Life Sciences 2B**5 QH**

For nonchemistry majors who will be taking CHM 1264. Covers chemical kinetics and equilibria, acids and bases, elementary thermodynamics and kinetics, and electrolysis and electrochemistry. Lab fee. *Prereq.* CHM 1111.

- CHM 1130 Fundamentals of Chemistry** 4 QH
Focuses on applications and principles of chemistry. Examines elementary atomic theory, physical and chemical properties of matter, chemical reactions and stoichiometry, and chemical measurements with applications in engineering technology.
- CHM 1131 General Chemistry for Engineering Students 1** 4 QH
Primarily for engineering students. Introduces the principles of chemistry, focusing upon the states and structure of matter and chemical stoichiometry.
- CHM 1132 General Chemistry for Engineering Students 2** 4 QH
Primarily for engineering students. Introduces the principles of chemistry, focusing upon chemical equilibria, the nature of some common materials, and energy considerations in chemical and nuclear transformations. *Prereq.* CHM 1131.
- CHM 1138 General Chemistry Laboratory** 1 QH
Required for students planning to major in chemical engineering. Optional for other students taking CHM 1132. Experiments pertaining to lecture material. Lab fee.
- CHM 1151 General Chemistry for Science Majors 1** 5 QH
For chemistry majors and selected students in other majors, such as biology, physics, and so on. Focuses on basic concepts and definitions, moles, gas laws, stoichiometry, atomic structure, periodic properties, and chemical bonding. Lab fee.
- CHM 1152 General Chemistry for Science Majors 2** 5 QH
Covers solutions, chemical kinetics, chemical equilibrium, chemical thermodynamics, electrochemistry, chemistry of the representative elements. Lab fee. *Prereq.* CHM 1111 or CHM 1151.
- Advanced Chemistry Courses**
- CHM 1221 Analytical Chemistry** 4 QH
For nonchemistry majors. Covers the principles and practice of chemical methods of analysis with an introduction to spectrophotometry, ion selective electrodes, and gas chromatography. Discusses methods and applications for the fields of biology, clinical chemistry, toxicology, and environmental investigations. Lab fee. *Prereq.* CHM 1122 or equivalent.
- CHM 1231 Analytical Chemistry for Majors** 5 QH
For chemistry majors. Covers the principles and practice of chemical methods of analysis with an introduction to spectrophotometry, ion selective electrodes, and gas chromatography. Examines method development, equilibrium limitations in analysis, and statistical evaluation of data as well as methods and applications for the fields of biochemistry, industrial chemistry, and chemical research. Lab fee. *Prereq.* CHM 1152 or equivalent.
- CHM 1264 Organic Chemistry for Biology Science Majors 1** 5 QH
For nonchemistry majors. Covers nomenclature, preparation, properties, and reactions of common organic compounds. Lab fee. *Prereq.* CHM 1122, CHM 1152, or equivalent.
- CHM 1265 Organic Chemistry for Biology Science Majors 2** 5 QH
Continues CHM 1264. Lab fee. *Prereq.* CHM 1264.
- CHM 1268 Organic Chemistry for Pharmacy Majors 1** 5 QH
For pharmacy majors. Covers nomenclature, preparation, properties, and reactions of common organic compounds. Lab fee. *Prereq.* CHM 1122, CHM 1152, or equivalent.
- CHM 1269 Organic Chemistry for Pharmacy Majors 2** 5 QH
Continues CHM 1268. Lab fee. *Prereq.* CHM 1268.
- CHM 1271 Organic Chemistry for Chemistry Majors and Chemical Engineering Students 1** 3 QH
For chemistry majors, chemical engineering students, and selected students in other majors. Covers synthesis and properties of aliphatic and aromatic hydrocarbons and their functional derivatives, correlation between the structure of organic compounds and their physical and chemical properties, and electronic interpretation of organic reactions. *Prereq.* CHM 1153 or CHM 1132, and CHM 1138 or equivalent.
- CHM 1272 Organic Chemistry for Chemistry Majors and Chemical Engineering Students 2** 5 QH
Continues CHM 1271. Lab fee. *Prereq.* CHM 1271.
- CHM 1273 Organic Chemistry for Chemistry Majors and Chemical Engineering Students 3** 5 QH
Continues CHM 1272. Lab fee. *Prereq.* CHM 1272.
- CHM 1274 Organic Chemistry of Living Processes** 5 QH
Examines advanced functional group chemistry, especially as relevant to molecules of nature. Studies polycarbonyl compounds, phenols, carbohydrates, lipids, terpenoids and steroids, amino acids and peptides, alkaloids, nucleic acids, and antibiotics and hormones.
- CHM 1381 Physical Chemistry 1** 3 QH
Introduces chemical thermodynamics. Covers the three laws of thermodynamics and their applications to thermochemistry, material equilibrium, and reaction equilibrium. *Prereq.* CHM 1132, CHM 1152, or equiv.; MTH 1223, MTH 1243, or equivalent; PHY 1223, PHY 1233, or equivalent.
- CHM 1382 Physical Chemistry 2** 3 QH
Continues chemical thermodynamics, kinetics, and transport processes. Covers theoretical concepts and practical applications of phase equilibria, quantitative use of phase diagrams, kinetic molecular theory and applications to transport processes, reaction kinetics, and mechanism. *Prereq.* CHM 1381.
- CHM 1383 Physical Chemistry 3** 3 QH
Presents the fundamental principles of quantum mechanics and their application to chemical problems. Emphasizes applications to atomic and molecular spectroscopy. *Prereq.* CHM 1382.
- CHM 1394 Experimental Physical Chemistry 1** 2 QH
Presents experiments that demonstrate simple yet accurate ways of measuring fundamental physical chemical phenomena. Examines treating experimental methodology and error analysis. Introduces computer-based data analysis. Emphasizes the preparation of concise and literate laboratory reports. Lab fee. *Prereq.* CHM 1381 or taken concurrently.
- CHM 1395 Experimental Physical Chemistry 2** 2 QH
Examines experiments based on various physical chemistry topics presented in CHM 1382. Explains and demonstrates computer interfacing of experimental apparatus. Focuses on data analysis using computer-based spread sheet and analysis programs. Emphasizes preparing concise and literate laboratory reports. Lab fee. *Prereq.* CHM 1382 or taken concurrently.

- CHM 1396 Experimental Physical Chemistry 3 2 QH**
Focuses on experiments in atomic and molecular spectroscopy and molecular photophysics that illustrate the principles discussed in CHM 1383. Emphasizes experimental methodology and preparing reports. Lab fee. *Prereq.* CHM 1383 or taken concurrently.
- CHM 1422 Instrumental Methods of Analysis 4 QH**
For chemistry majors and selected students in other majors. Covers principles, methods, and applications of electroanalytical chemistry, optical spectroscopy, and chromatography. Includes selected topics in instrumental design and function and in non-optical spectroscopy. *Prereq.* CHM 1382 and CHM 1231, or permission of instructor. Chemistry majors take CHM 1432 concurrently.
- CHM 1432 Instrumental Analysis Laboratory 2 QH**
For chemistry majors and selected students in other majors registered for CHM 1422. Focuses on lab experiments related to topics covered in CHM 1422. Lab fee.
- CHM 1441 Inorganic Chemistry 4 QH**
Studies atomic properties of free atoms and ions; ionic bonding and the structure of the solid state; the Madelung calculation; the Born-Haber and other thermodynamic cycles; valence-bond, molecular, orbital, and crystal field theories of bonding; stereochemistry of compounds of representative elements; electron-deficient compounds; and spectral and magnetic properties of transition metal compounds. *Prereq.* CHM 1383.
- CHM 1451 Experimental Inorganic Chemistry 2 QH**
Presents topics in modern inorganic and organometallic chemistry. Introduces important experimental techniques. Lab fee. *Prereq.* CHM 1441 or taken concurrently.
- CHM 1461 Identification of Organic Compounds 3 QH**
Examines qualitative analysis of organic compounds and mixtures, using physical, chemical, and instrumental methods. Lab fee. *Prereq.* CHM 1265 or CHM 1273.
- CHM 1491, CHM 1492 Directed Study 2 QH each**
Offers independent work under the direction of a faculty member. *Prereq.* An organic chemistry sequence, and analytical chemistry and departmental approval.
- CHM 1521 Advanced Analytical Chemistry 1 3 QH**
Examines analytical separations. Corresponds to CHM 3521. *Prereq.* CHM 1422 or equivalent.
- CHM 1523 Advanced Analytical Chemistry 2 3 QH**
Examines the theory, practice, instrumentation, and application of selected electroanalytical methods of analysis. Corresponds to graduate course CHM 3523. *Prereq.* CHM 1422 or equivalent.
- CHM 1525 Advanced Analytical Chemistry 3 3 QH**
Covers optical methods of analysis. Corresponds to CHM 3525. *Prereq.* CHM 1422 or equivalent.
- CHM 1561 Advanced Organic Chemistry 1 3 QH**
Focuses on organic structure and reactions. Corresponds to graduate course CHM 3561. *Prereq.* CHM 1273 or CHM 1265.
- CHM 1562 Advanced Organic Chemistry 2 3 QH**
Examines organic structure and reactions. Corresponds to graduate course CHM 3562. *Prereq.* CHM 1561.
- CHM 1563 Advanced Organic Chemistry 3 3 QH**
Focuses on organic structure and properties. Corresponds to graduate course CHM 3563. *Prereq.* CHM 1562.
- CHM 1564 Spectrophotometric Identification of Organic Compounds 3 QH**
Examines spectrophotometric identification of organic compounds. Corresponds to graduate course CHM 3564. *Prereq.* CHM 1273 or equivalent.
- CHM 1581 Advanced Physical Chemistry 1 3 QH**
Examines chemical thermodynamics. Corresponds to graduate course CHM 3581. *Prereq.* CHM 1383.
- CHM 1591 Advanced Physical Chemistry 2 3 QH**
Focuses on atomic and molecular structure. Corresponds to graduate course CHM 3591. *Prereq.* CHM 1383.
- CHM 1738 General Chemistry Laboratory (Honors) 1 QH**
Honors equivalent of CHM 1138.
- CHM 1741 General Chemistry 1 (Honors) 4 QH**
Honors equivalent of CHM 1131.
- CHM 1742 General Chemistry 2 (Honors) 4 QH**
Honors equivalent of CHM 1132.
- CHM 1751 General Chemistry 1 (Honors) 5 QH**
Honors equivalent of CHM 1151.
- CHM 1752 General Chemistry 2 (Honors) 5 QH**
Honors equivalent of CHM 1152.
- CHM 1800, CHM 1801, CHM 1802, CHM 1803, CHM 1804, CHM 1805 Undergraduate Research 4 QH each**
Students may conduct original experimental work under the direction of a faculty member. A minimum of a two-quarter commitment and approval of the executive officer of the chemistry department are required. *Prereq.* Middler standing or above, chemistry major status, and a minimum QPA of 2.8 in courses required for the major.
- CHM 1811 Advanced Chemical Laboratory Practice 1 4 QH**
Staff members direct lab projects in analytical, inorganic, organic, and physical chemistry. Lab fee. *Prereq.* CHM 1273, CHM 1395, CHM 1396, CHM 1422, and departmental approval.
- CHM 1812 Advanced Chemical Laboratory Practice 2 4 QH**
Students may continue lab projects from CHM 1811 or carry out new projects in different areas. Lab fee. *Prereq.* CHM 1811 and departmental approval.
- CHM 1840, CHM 1841, CHM 1842, CHM 1843 4 QH each**
Junior/Senior Honors Project
For details contact the honors office.

Communication Studies

- CMN 1110 Voice and Articulation 4 QH**
Provides training in developing clear and articulate speech. Includes topics such as the physiology of the vocal mechanism, voice projection and variety, articulation and pronunciation, and appropriate speech. Trains students through lectures, drills, and exercises.

- CMN 1111 Oral Interpretation of Literature** 4 QH
Teaches the theory and skill of dramatic reading, with an emphasis on analyzing and presenting literature orally. Analyzes prose, poetry, and dramatic selections to communicate the author's meaning through voice, tone, and gesture.
- CMN 1115 Foundations of Communications** 4 QH
Explores the history and nature of human interaction through speech. Includes such topics as the communication process; verbal and nonverbal; interpersonal, group, and public communication contexts; communication ethics; and the mass communication media. Offers the opportunity to learn principles governing effective communication.
- CMN 1116 Public Speaking** 4 QH
Develops skills in public communication. Includes topics such as choosing and researching a topic, organizing and delivering a speech, handling speech anxiety, listening critically, and adapting language to an audience. Offers the opportunity for students to present a series of speeches and receive advice and criticism from an audience.
- CMN 1210 Advanced Voice and Articulation** 4 QH
Develops the vocal techniques introduced in CMN 1110. Includes work with speech patterns and dialects. Develops the professional speaking voice through exercises and applying concepts. *Prereq.* CMN 1110.
- CMN 1211 Advanced Oral Interpretation** 4 QH
Provides an in-depth study of analyzing and performing literature. Includes topics such as classical literature, group performance of literature, and programming. *Prereq.* CMN 1111.
- CMN 1232 Communication and Gender** 4 QH
Reviews contemporary research in gender, specifically the role that gender plays in human communication. Includes topics such as "genderlect," gender bias in language, and gender images communicated in the media.
- CMN 1239 Argumentation and Debate** 4 QH
Introduces the principles and skills of effective argument. Includes topics such as the process of advocacy, developing an argument through reasoning, the psychology of argument, and motivational techniques of argumentation. Combines theory and practice in argument through individual presentations and team debates. *Prereq.* CMN 1116 or permission of instructor.
- CMN 1240 Advanced Studies in Speech Performance** 4 QH
Provides an opportunity to expand skills and strategies in public speaking and debate. Designed for students in the forensic program and for students wishing more in-depth study of public speaking and debate. Emphasizes development of competitively successful approaches to public speaking. *Prereq.* CMN 1116 or CMN 1239 or permission of instructor.
- CMN 1250 Introduction to Mass Communication** 4 QH
Surveys the various media of communication. Includes radio, television, film, newspapers, magazines, and electronic communication. Explores the impact media have on society.
- CMN 1300 Communication Theory** 4 QH
Surveys significant theories of human communication. Emphasizes such topics as systems theory, symbolic interaction theory, structuralist theories, and critical-cultural studies.
- CMN 1310 The Classical Age of Speech and Rhetoric** 4 QH
Surveys theories of persuasive speech in ancient Greece and Rome. Includes Aristotle's rhetoric, Sophistic traditions, the rhetoric of Cicero and Quintilian, and famous speeches of the Golden Age of Athens. Teaches the roots of the discipline of speech and communication.
- CMN 1315 Theories of Persuasion** 4 QH
Examines the behavioral theories used to create or modify beliefs, attitudes, and values. Studies how professional persuaders conceive of and execute arguments for specific audiences.
- CMN 1317 The Audience in Mass Communication** 4 QH
Explores how mass media audiences interpret and actively use media messages and products as listeners, readers, and consumers. Examines the different stages of ethnographic research, audience meanings and interpretations, pleasure and fandom, the role of media in everyday life, and the use of ethnographic research methods in communications studies. *Prereq.* CMN 1250.
- CMN 1318 Negotiation Skills** 4 QH
Focuses on the process of negotiating mutually acceptable agreements in adversarial settings. Emphasizes collective bargaining as a form of problem solving, and resolving conflict through mediation. *Prereq.* *Middler standing or above or permission of instructor.*
- CMN 1330 Interpersonal Communication** 4 QH
Helps students improve their interpersonal communications skills. Includes topics such as the self in communication, self-disclosure, language, nonverbal communication, listening skills, conflict resolution, and maintaining functional relationships through communication.
- CMN 1331 Advanced Interpersonal Communication** 4 QH
Continues instruction in interpersonal communication. Focuses on applying principles of effective communication to human relationships. *Prereq.* CMN 1330.
- CMN 1338 Group Discussion** 4 QH
Develops skills in working with and in small groups. Instructs in the small group decision-making process as well as in the interpersonal dynamics of the group. Includes topics such as problem solving, conflict resolution, role playing, and leadership.
- CMN 1410 Contemporary Public Address** 4 QH
Analyzes significant public speeches from the recent past. Gives an opportunity to appreciate the role of oratory in major political and social movements by studying audio and videotapes of historic and influential speakers. Uses various critical theories to develop skills in criticism.
- CMN 1415 Persuasion in Contemporary Culture** 4 QH
Develops students' critical thinking skills as receivers of persuasive communication. Examines instances of persuasion in popular culture such as advertising, mass media, and politics. Helps students become more informed, critical receivers of mediated messages. *Prereq.* CMN 1315 or permission of instructor.
- CMN 1430 Organizational Communication** 4 QH
Surveys the communication process in complex organizations. Includes topics such as the evolution of organizational communication, communication networks, information management, and communication climate. Analyzes case studies and teaches how to improve the quality of communication in an organization.

CMN 1431 Advanced Organizational Communication	4 QH	department prior to quarter in which it is offered. <i>Please consult prior to registering.</i>
Examines the problems of sending and receiving information in complex organizations. Reviews technologies used to disseminate information, communication auditing processes, and methods to devise and assess communication programs for organizations. <i>Prereq.</i> CMN 1430.		
CMN 1437 Consultation Skills	4 QH	CMN 1554 Special Topics in Media 4 QH
Surveys techniques used to analyze communication problems in industry, organizations, and groups. Includes theory and practice using the case study methods. Offers students the opportunity to learn how to audit an organization, identify problems in communication, and suggest solutions. <i>Prereq.</i> CMN 1115 and CMN 1338.		Examines various contemporary issues in mass media.
CMN 1450 Television Studio Production	4 QH	CMN 1555 Communication and the Quality of Life 4 QH
Introduces studio production techniques. Covers the creative and technical elements of video production, camera operation, floor direction, editing graphics, lighting, picture composition, and directing methods. <i>Prereq.</i> CMN 1250 or permission of instructor.		Exposes students to the role that communication plays in the quality of individual and community life. Helps students explore the impact of contemporary communication trends. Analyzes the impact of various media on quality of life. <i>Prereq.</i> Middler standing, CMN 1330, or permission of instructor.
CMN 1451 Foundations of Broadcast Technology	4 QH	CMN 1600 Introduction to Communication Research 4 QH
Surveys the history of radio and television broadcasting technology in the United States and around the world. Includes the evolution of technology, broadcast television versus cable and pay-per-view, effects of technology on the media, and the future of broadcast technology. Develops an understanding and appreciation of broadcast technology's impact on contemporary society.		Introduces the various methods through which scholars of communication develop knowledge. Includes historical, descriptive, experimental, and ethnographic methods. Expects student to engage in individual research projects designed to increase familiarity with communication literature and to develop skills in critical writing and library research. <i>Prereq.</i> CMN 1300 or permission of instructor.
CMN 1452 Radio Production	4 QH	CMN 1610 Rhetorical Criticism 4 QH
Introduces the principles and practices of radio. Includes lab work in studio production and instruction in program design, ratings, and on-air performance. Gives students an opportunity to produce broadcast material such as feature stories, commercials, and public service announcements. <i>Prereq.</i> CMN 1250 or permission of instructor.		Offers a critical analysis of a range of rhetorical texts: visual, literary, oral, and musical. Includes traditional and cultural approaches to criticism. (V)
CMN 1453 Broadcast Management	4 QH	CMN 1620 Television Criticism 4 QH
Examines the four critical functions of media management: economics, marketing, advertising, and ratings. Includes FCC regulatory policies, external market forces, and internal management forces. <i>Prereq.</i> CMN 1250 and middler standing or above.		Offers an advanced communication course where students analyze and evaluate representations of race, class, gender, and the family in television discourse. Aims to increase awareness of the ways that the aural, visual, and aesthetic codes of television work to shape beliefs and values. <i>Prereq.</i> CMN 1610.
CMN 1454 Programming for Radio and Television	4 QH	CMN 1800, CMN 1801, CMN 1802, CMN 1803 4 QH each
Examines the history of radio and television programming and the structure in which programming operates. Covers network, network affiliate, independent, cable, and public television and radio, and the major suppliers of programs such as Hollywood studios, independent producers, syndicates, networks, and local stations. Reviews how the practical components of the program marketplace, such as rating, scheduling, regulation, and advertising, developed historically. Includes an opportunity to design a music wheel for radio and a short video segment for television.		Junior/Senior Honors Project
CMN 1455 Television Field Production	4 QH	For details contact the honors office.
Offers advanced training in video production techniques, emphasizing remote location shooting. Includes location scouting, production budgets, writing techniques, equipment location, post-production editing, and content analysis. Offers the opportunity to work in teams to produce and direct television using remote video equipment. <i>Prereq.</i> CMN 1250 and CMN 1450.		CMN 1890, CMN 1891, CMN 1892 Directed Study 4 QH each
CMN 1500 Special Topics in Communication Studies	4 QH	<i>Prereq.</i> Permission of instructor.
Examines various contemporary issues in communication studies. Course content to be posted in communication studies		CMN 1893 Directed Study 1 QH
		<i>Prereq.</i> Permission of instructor.
		CMN 1894 Directed Study 2 QH
		<i>Prereq.</i> Permission of instructor.
		CMN 1895 Internship in Speech Communication 4 QH
		Gives students the opportunity to gain hands-on experience in the communications industry. Requires prior approval by the internship director prior to registration. Further internship details are available in the department office.

Economics

Unless otherwise stated, there are no prerequisites for advanced economics courses. Where prerequisites are indicated, exceptions may be granted with the instructor's permission.

ECN 1001 Economic Problems and Perspectives	4 QH
Studies the economic concepts and methods that are useful to an informed citizen for an understanding of modern social issues such as unemployment, inflation, poverty, crime, the environment,	

medical care, and international competitiveness. *Not recommended for students who have completed either ECN 1115 or ECN 1116.*

ECN 1115 Principles of Macroeconomics 4 QH

Introduces macroeconomic analysis. Topics include the flow of national income, economic growth and fluctuation, the role of money and banking, and monetary and fiscal policies. Emphasizes the development of conceptual tools to analyze the economic problems facing modern society. (II) (Pathway)

ECN 1116 Principles of Microeconomics 4 QH

Focuses on development of basic theory of demand, supply, and market price. Explores applications to selected microeconomic problems, such as basic monopoly and competition, and other issues that relate to the role of the pricing system in resource allocation and income distribution. (II) (Pathway)

ECN 1130 Medical Economics 4 QH

Examines health-care trends in the United States and selected foreign countries, causes of the rising costs of medical care, the particular nature of the demand for health-care services, the demand for physicians and paramedical personnel, Certificate of Need committees, health maintenance organizations, medical malpractice, increases in life expectancy and its impact on society, third-party payers, and the true cost of medical education. (Pathway)

ECN 1140 Economics of Crime 4 QH

Covers economic analysis of crime and the criminal justice system. Topics include theoretical and empirical analysis of the economic causes of criminal behavior, the social costs of crime and its prevention, and design of enforcement policies. (Pathway)

ECN 1150 Economics of World Energy and Primary Resources 4 QH

Investigates economic, political, and historical backgrounds of energy and other resources problems. Analyzes future impact of primary resources limitations on United States and world economics as well as feasibility studies of resource substitution. (Pathway)

ECN 1170 Economic Issues In Minority Communities 4 QH

Examines the economic conditions of nonwhite minorities within the United States economy. Includes historical and cultural materials as well as specific theoretical and empirical analysis of the economic problems confronting minority communities. Same as AFR 1161. (VI) (Pathway)

ECN 1215 Macroeconomic Theory 4 QH

Investigates the conceptual and empirical problems of creating and using national accounts, price index problems, conceptual and empirical evaluation of consumption and investment functions and their policy implications, multiplier and accelerator models, and recent cyclical fluctuations. Analyzes theories of inflation, unemployment, and growth in the light of recent economic history. *Prereq.* ECN 1115 or two Pathway courses, and MTH 1114 or equivalent.

ECN 1216 Microeconomic Theory 4 QH

Examines supply-and-demand analysis, various elasticity concepts and applications, theories of demand and production, and derivation of cost curves. Analyzes pricing and output behavior in the several market structures with their welfare implications and the pricing of resources. *Prereq.* ECN 1116 or two Pathway courses, and MTH 1114 or equivalent.

ECN 1250 Statistics 4 QH

Discusses basic probability, descriptive statistics, estimation techniques, statistical hypotheses, sampling, analysis of variance, correlation, and regression analysis in the context of economics. Computer applications are an integral part of this course. *Economics majors who have earned credit for ECN 1250 may not receive credit for MSC 1200 or MTH 1152.*

ECN 1251 Statistics 2 4 QH

Studies analysis of variance, correlation and linear regression analysis, multivariate regression analysis, and Bayesian decision making. *Prereq.* ECN 1250. *Economics majors who have earned credit for ECN 1251 may not receive credit for MSC 1201.*

ECN 1310 Labor Economics 4 QH

Focuses on economic analysis of the labor market and the labor force. Topics include the supply, development and efficient use of human resources; wage determination; the changing occupational and industrial structure; causes, nature and incidence of unemployment; the economic impact of unions, related labor market institutions and relevant public policies. *Prereq.* ECN 1116 or ECN 1115 or any three economics courses (excluding ECN 1250).

ECN 1311 Employment and Training Programs and Policies 4 QH

Examines the nature and objectives of employment and training programs, the nature and causes of human resource problems, current and previous efforts to solve human resource problems in the United States, planning of human resource programs, and economic evaluation of employment and training programs. *Prereq.* ECN 1115 or any three economics courses (excluding ECN 1250).

ECN 1312 Women in the Labor Market 4 QH

Focuses on economic analysis of the labor market position of women in the context of the changing economic structure and labor market institutions. Analyzes female labor force participation differences; male/female differentials in earnings and unemployment; occupational concentration, occupational segregation, theories and evidence of sex discrimination; and new opportunities for women. (Pathway)

ECN 1314 Economics of Education and Human Capital 4 QH

Explores theoretical and empirical treatment of economic issues related to education and job training, including formal education (preschool through post-secondary), vocational education, on-the-job training, and government-sponsored employment and training programs. Emphasizes follow-up studies, cost-effectiveness analysis, and benefit-cost analysis for determining the effectiveness of education and training investments from a private and social standpoint. *Prereq.* ECN 1116 or any three economics courses (excluding ECN 1250).

ECN 1315 Income Inequalities and Discrimination 4 QH

Focuses on economic analysis of income inequalities, poverty, and discrimination. Examines the causes of income inequality and the nature, causes and effects of poverty; economics of racial discrimination; and public welfare system and other income maintenance schemes. *Prereq.* ECN 1115 or ECN 1116 or any three economics courses (excluding ECN 1250).

ECN 1320 Urban Economics 4 QH

Studies urban growth and development, intermetropolitan location of business firms, regional shifts in economic activity, intrametropolitan location of firms and households, and land use patterns. *Prereq.* ECN 1116 or any three economics courses (excluding ECN 1250).

ECN 1321 Urban Economic Problems and Policies**4 QH**

Continues ECN 1320 but may be taken separately. Focuses on economic analysis of selected urban problems such as housing, poverty, transportation, education, health, crime, and the urban environment. Discusses public policies relating to such problems. *Prereq.* ECN 1116 or any three economics courses (excluding ECN 1250).

ECN 1322 Economics of Transportation**4 QH**

Covers transportation and land-use patterns; externalities; social costs and social benefits of various modes of transportation, ownership, regulations, and financing of various modes of transportation; and economics of new technology in transportation. *Prereq.* ECN 1116 or any three economics courses (excluding ECN 1250).

ECN 1323 Environmental Economics**4 QH**

Applies the tools of economics to environmental issues. Explores taxonomy of environmental effects; externalities; the commons problem; taxation, regulations, marketable permits, and property rights as a solution; measuring benefits of cleaner air and water, noise abatement, and recreational areas; global issues including tropical deforestation and acid rain; the relevance of economics to the environmental debate. *Prereq.* ECN 1116 or any three economics courses (excluding ECN 1250).

ECN 1330/IAF 1330 Development Economics**4 QH**

Explores prospects for economic growth and development in poor nations as indicated by economic analysis and historical experience; social, cultural, and institutional determinants of growth; analysis of agriculture and development; the role of technological change; population; and foreign trade. (V) (Pathway)

ECN 1331 American Economic Development**4 QH**

Studies economic development of the United States from the colonial period to the present, historical changes in economic institutions and technologies, with special attention to preconditions of industrialism; the American Industrial Revolution, its spread and socioeconomic consequences; the Great Depression and the subsequent rise of mixed economy and welfare state; and United States adjustments to postwar economic changes. (Pathway)

ECN 1332 Economic History of Less Developed Countries**4 QH**

Considers the problems of initiating and sustaining economic development in selected Third World countries during the last two hundred years. Country-specific case studies cover the role of traditional economic structures, different development goals and strategies, state policies, and international economic relations. *Prereq.* ECN 1115 and ECN 1116 or any three economics courses (excluding ECN 1250); ECN 1330 recommended.

ECN 1333 European Economic Development**4 QH**

Discusses economic inheritance of the nineteenth century development of capitalism and laissez-faire; the aftermath of the Industrial Revolution, European overseas expansion, the world wars, and the dissolution of empires; American economic conquest and European integration; the future of less developed areas as in southern Europe; environmental impact of industrialism and the implications of technological society. (III) (Pathway)

ECN 1334 Comparative Economics**4 QH**

Emphasizes competing types of theoretical economic systems; analysis of organization and operation of currently existing types

of communist, socialist, and capitalist economies; comparison and evaluation of economic behavior and performance of different economic systems. *Prereq.* ECN 1115 and ECN 1116 or any three economics courses (excluding ECN 1250).

ECN 1335 International Economics: Finance**4 QH**

Introduces the workings of foreign exchange markets, balance of payments, fiscal and monetary policy in an open economy under different exchange rate regimes, international capital movements, and the international monetary system. *Prereq.* ECN 1115 or any three economics courses (excluding ECN 1250) or permission of instructor.

ECN 1336 International Economics: Trade**4QH**

Examines trade theories and patterns, impact of trade on domestic factor prices, factor movements, and terms of trade. Explores welfare implications and political economy of alternative trade policies, such as free trade, tariffs, quotas, and custom unions. *Prereq.* ECN 1116 or any three economics courses (excluding ECN 1250) or permission of instructor.

ECN 1337 History of Economic Thought**4 QH**

Traces the evolution of Western economic thought. Covers several important schools in economics, examining the questions economists raise and analytical methods they use to study human behavior. *Prereq.* ECN 1115 and ECN 1116 or any three economics courses (excluding ECN 1250).

ECN 1340 Government Expenditures: Structure and Evaluation**4 QH**

Covers fiscal functions of government, fiscal institutions and politics, theory of social goods, public expenditure growth and structure, federal budget expenditure evaluation and cost-benefit case studies, fiscal federalism in theory and practice, and issues of public debt and deficit. *Prereq.* ECN 1116 or equivalent or any three economics courses (excluding ECN 1250).

ECN 1341 Financing of Government: Taxation and Debt**4 QH**

Considers principles of taxation; problems of tax structure and reform at federal, state, and local levels; tax incidence; effects of taxation on economic efficiency and growth; negative income tax and social security finance; issues of public debt and deficit. *Prereq.* ECN 1116 or equivalent or any three economics courses (excluding ECN 1250).

ECN 1342 Money and Banking**4 QH**

Studies the nature and the functions of money, credit, and the role of financial organizations in the United States economy. Emphasizes theories of banking, money supply, and monetary policy. *Prereq.* ECN 1115 or equivalent or any three economics courses (excluding ECN 1250).

ECN 1345 Business Cycles and Inflation**4 QH**

Considers the theories of business cycles and inflation and an empirical application of these theories to current business cycle, inflation, and stagflation problems. *Prereq.* ECN 1115 and ECN 1116 or any three economics courses (excluding ECN 1250), and ECN 1215.

ECN 1350 Introduction to Econometrics**4 QH**

Presents an introduction to the methods of econometric analysis and forecasting. Covers ordinary least squares, piecewise regression, tests and corrections for serial correlation and heteroskedasticity, specification analysis, simultaneous equations systems, errors in variables, dynamic models and elementary forecasting.

Prereq. ECN 1115 and ECN 1116 or any three economics courses (excluding ECN 1250), and ECN 1250.

ECN 1351 Problems in Economic Research

4 QH

Examines research methods used by practicing economists. Discusses typical problems from applied areas of economics, including choice of modeling framework, problems of data collection, review of estimation techniques, interpretation of results, and development of static and dynamic adaptive policy models. *Prereq. ECN 1115 and ECN 1116 or any three economics courses (excluding ECN 1250), and ECN 1250.*

ECN 1353 Introduction to Mathematics for Economists

4 QH

Introduces basic tools of mathematics, matrix algebra, differential and integral calculus and classical optimization, with special reference to economic applications. *Prereq. ECN 1115 and ECN 1116 or any three economics courses (excluding ECN 1250).*

ECN 1360 Managerial Economics

4 QH

Explores the application of economic principles and theory, by the use of case studies, to the solution of decision-making problems in such areas as demand forecasting, price policies, estimation and control of costs, financing of capital investments, and responses to government taxation and regulation policies. *Prereq. ECN 1116 or any three economics courses (excluding ECN 1250).*

ECN 1361 Social Control of Economic Activities

4 QH

Focuses on the development of the government's role in economic activities, examining the relationships between the government and industry, labor, agriculture, public utilities, and consumers. Traces the changing role of the government from a laissez-faire policy to one of direct intervention in the economy. Covers such topics as wage and price control, environment and antipollution policies, consumer protection, and conglomerate mergers. (Pathway)

ECN 1362 Industrial Organization and Public Policy

4 QH

Presents an analytic framework and empirical study of how the structure of industrial organization and conduct of sellers and buyers affects economic performance and welfare. Includes industrial examples and case studies. Examines antitrust as a public policy designed to promote better market performances. *Prereq. ECN 1116 or any three economics courses (excluding ECN 1250).*

ECN 1363 Economics of Art and Culture

4 QH

Presents an overview of the economic aspects of art and culture. Examines the production and consumption of art and culture and the role of the public and private sectors. Topics include: consumer demand, economic models of nonprofit cultural organization, competition and market structure in the arts, artists as members of the labor force, productivity issues in the performing arts, public support for the arts, and the role and impact of public and private subsidies. (Pathway)

ECN 1401 Advanced Economic Theory

4 QH

Covers advanced theoretical treatment of selected topics in micro- and macroeconomics. Recommended for students planning to take graduate economics. *Prereq. ECN 1215 and ECN 1216.*

ECN 1415 Selected Topics in Macroeconomics

4 QH

Studies macroeconomic issues. *Prereq. Permission of instructor.*

ECN 1416 Selected Topics in Microeconomics

4 QH

Studies microeconomic issues. *Prereq. Permission of instructor.*

ECN 1481 Directed Study

1 QH

Offers independent work on a chosen topic under the direction of a faculty member of the department. Should not be substituted for the course requirements leading to a BA or BS degree in economics. Up to four quarter hours per offering, with an eight quarter-hour maximum. *Prereq. Qualified senior economics majors and approval of department chair.*

ECN 1482 Directed Study

2 QH

Offers independent work on a chosen topic under the direction of a faculty member of the department. Should not be substituted for the course requirements leading to a BA or BS degree in economics. Up to four quarter hours per offering, with an eight quarter-hour maximum. *Prereq. Qualified senior economics majors and approval of department chair.*

ECN 1483 Directed Study

3 QH

Offers independent work on a chosen topic under the direction of a faculty member of the department. Should not be substituted for the course requirements leading to a BA or BS degree in economics. Up to four quarter hours per offering, with an eight quarter-hour maximum. *Prereq. Qualified senior economics majors and approval of department chair.*

ECN 1484 Directed Study

4 QH

Offers independent work on a chosen topic under the direction of a faculty member of the department. Should not be substituted for the course requirements leading to a BA or BS degree in economics. Up to four quarter hours per offering, with an eight quarter-hour maximum. *Prereq. Qualified senior economics majors and approval of department chair.*

ECN 1492 Senior Economics Seminar

4 QH

Coordinates and applies economic concepts, methodology, and data to issues and problems of broad social, economic, and philosophical importance. *Prereq. ECN 1216 and ECN 1215; senior economics majors only.*

**ECN 1495, ECN 1496, ECN 1497, ECN 1498
Junior/Senior Honors Project**

4 QH each

For details contact the honors office.

ECN 1715 Macroeconomics Principles (Honors)

4 QH

Honors equivalent of ECN 1115.

ECN 1716 Microeconomics Principles (Honors)

4 QH

Honors equivalent of ECN 1116.

Education

ED 1003 Reading/Study Skills 1

4 QH

Provides instruction to students who demonstrate a need to be more efficient in comprehending and studying college textbooks and collateral reading assignments. Concentrates on techniques involved in understanding informative materials and introduces the evaluation of persuasive prose. In addition, presents suggestions on such topics as how to listen to and take summary notes on course lectures and how to set study goals and priorities consistent with course objectives.

ED 1004 Reading/Study Skills 2 4 QH

Continues topics introduced in ED 1003 and expands upon the analysis and interpretation of persuasive texts. Emphasizes reading imaginative prose for meaning and pleasure, preparing for and taking examinations, and learning to adjust reading speed and method to various materials encountered in concurrent courses.

ED 1005 Practicum in Reading and Study Skills 4 QH

Gives students in the academic program Project Ujima comprehensive tools to help them to master the how-to's of reading textbooks, notetaking, outlining, introductory research skills, time management, studying skills, and other techniques necessary for success in college.

ED 1100 Human Services and Social Science 4 QH

Draws on anthropology, psychology, and sociology, and some of the concepts, methods, and terminology of those fields. Concentrates on the evolution of human nature, the influence of previous experience and learning on the behavior of individuals and groups, the difficulties in achieving a full degree of humanity in a technological society, and the potentially powerful roles that "professional socializers" (teachers, clinicians, group leaders, and so forth) can play in the lives of students and clients.

ED 1101 Introduction to Education 4 QH

Discusses human survival and continued development as problems of educating people to use their skills and abilities to live harmoniously. Examines the teaching and learning process used to transmit information and values from one generation to the next, and places these processes in the context of the past, present, and future of the American family and education. Approaches these issues with a creative and humanistic perspective.

ED 1102 Child Development, Learning and Education 4 QH

Surveys developmental processes from the prenatal period through preadolescence. Covers principles of physical, cognitive, language, social, and personality development and discusses the implications for childrearing and schooling.

ED 1103 Adolescent Development, Learning and Education 4 QH

Presents a basic overview of the continuity of human development in contemporary society, from the pre-adolescent period through adolescence, adulthood, middle age, and old age. Considers significant areas of growth, development, and adjustment for each period, including social, sexual, personality, motivational, and cognitive aspects.

ED 1104 Learning and the Teaching Process 4 QH

Explores learning and teaching within different types of schools. Examines the pedagogical, environmental, and historical factors that affect the instructional processes and influence educational outcomes.

ED 1106 Creative Expression in Children 4 QH

Assists students who are interested in working with children in a variety of settings. Focuses on the potential of creative expression in interpersonal communication and the relation of children's creative experiences to their cognitive, emotional, and social development. Provides the opportunity to acquire the hands-on experience and confidence to work with various media available for creative expression. *Prereq.* ED 1102.

ED 1107 Beginning Computer Use in Education 4 QH

Introduces students who are unfamiliar with software applications to computer use through general purpose software: word processing and data processing. Covers operating systems commands as well as concepts relating to computer hardware and software. Suggests methods of applying the computer to study requirements in college and to teaching.

ED 1300 Education and Psychosocial Development 4 QH

Examines theories and research on the socialization functions of education. Covers the relative influence of early versus post-childhood socialization and the role of diverse educational experiences and institutions in personality development. *Prereq.* ED 1100 or equivalent.

ED 1302/HS 1302 The Human Services Professions 4 QH

Explores what a human service agency is, how it comes into being, how it grows and changes. Analyzes attitudes, values, skills, and knowledge of the human services worker and the reasons why people in modern society require human services assistance. Views human services from the eyes of clients as well as society as a whole. Requires fieldwork in a human service agency as well as a good deal of independent study. Required for all human services majors; open to other students on space-available basis. *Prereq.* ED 1100, SOC 1100, or equivalent.

ED 1309/HS 1309 Intervention Strategies for the Human Services 4 QH

Introduces the range of skills used in working with clients in the various helping professions such as counseling (individual and group), advocacy, rehabilitation, community organizing, and income maintenance. Utilizes role playing, simulations, and interviews with practicing professionals. Requires reading but not fieldwork. Intended as preparation for more specialized courses; required for human services majors but open to other students with appropriate backgrounds.

ED 1311 Case Management: Diagnosis and Treatment 4 QH

Introduces the basic theory and skills of managing clients' treatment programs in a variety of institutional settings. Provides training in identifying the components of a psychosocial assessment. Examines common techniques of planned service delivery and resource coordination and reviews the entitlements available to clients of diverse needs and backgrounds. *Prereq.* PSY 1111 or SOC 1100.

ED 1318 Seminar in Early Childhood Development 4 QH

Focuses on views of cognitive, personality, and social development during early childhood. Discusses the implications of these views. Requires each student to carry out a project in the field placement and report results to the seminar. *Prereq.* ED 1102.

ED 1319 Speech, Language, and Cognition in the Young Child 4 QH

Provides an overview of normal speech and language development and its relationship to cognition in the young child. Describes speech-language and cognitive behaviors in a variety of disordered populations and outlines a team approach to treating such disorders. Uses a variety of case studies to describe the assessment and remediation of young children with speech and language disorders in the classroom. Team taught by faculty from the Department of Education and from the Department of Speech-Language Pathology and Audiology. Provides students an opportunity to understand the implications of disordered speech and language for classroom learning. *Prereq.* ED 1102.

ED 1405 Literature and Learning Materials for Children and Young Adults 4 QH

Offers a comprehensive survey of the field of children's literature and literature for young adults. Although designed specifically for prospective teachers (and required of all Early Childhood and Elementary Education majors), may also be taken as an elective by all students. Surveys and evaluates examples of contemporary children's literature and other learning materials used in preschool, elementary, secondary, and remedial programs. Covers such recurring themes as racism and sexism in children's books, controversial books for young children, contemporary illustrators, and banned books.

ED 1406 Elementary Education Curriculum 1 4 QH

Examines rationales for major curriculum movements in elementary education, emphasizing what current research predicts as reasonable directions to follow. Engages students in different but complementary experiences to demonstrate that an array of teaching strategies enables children to learn in ways compatible for them. Gives particular attention to using sensory approaches via visual art, music, and movement as a basis for integrated program design in all subject areas. Stresses the nature of the thinking processes underlying the activities, and ways to sensitize children to these processes. Team taught by specialists in the arts and a specialist in curriculum. *Prereq.* ED 1104.

ED 1407 Elementary Education Curriculum 2 4 QH

Describes and evaluates social studies curricula in use in elementary school. Develops criteria to select appropriate social studies content, skills, and attitudinal objectives. Expects students to use these criteria to develop social studies experiences that meet the developmental needs of learners and to shed light on the lives of individuals and groups within different cultural settings. *Prereq.* ED 1406.

ED 1410 Methods and Materials for Teaching Adolescents and Adults 1 4 QH

Considers specific methods and materials appropriate to teaching adolescents and adults. Seeks to develop in the students an understanding of the complexities of the materials and methodology of the teaching-learning process, to encourage within students attitudes conducive to and identified with good tenets of teaching, and to foster in the students acceptance of the need to grow constantly and to be aware of the continuing development of the learning-teaching process. Requires fieldwork. *Prereq.* ED 1104.

ED 1411 Methods and Materials for Teaching Adolescents and Adults 2 4 QH

Focuses on the various subject areas of teaching techniques of organizing and presenting lessons, developing teaching materials, using audiovisual equipment, developing and implementing evaluation instruments, and selecting appropriate materials within the field of interest. Requires fieldwork. *Prereq.* ED 1410.

ED 1412 Fundamentals of Curriculum Development 4 QH

Examines how goals and objectives are selected and priorities are determined. Analyzes methods for designing educational programs to meet specified goals, methods of evaluating educational outcomes in terms of the goals of the program, and techniques for modifying programs in the light of such performance.

ED 1414 Current Issues in Teaching the Gifted and Talented 4 QH

Examines issues that affect the type and quality of education available to the gifted and talented in the United States. Describes and evaluates various approaches and programs and reaches conclusions about their effectiveness. Examines research findings on the needs of this segment of the population of learners in order to provide some criteria for future curriculum development.

ED 1417 Student Teaching Practicum and Seminar 8 QH

Allows for full-time participation in a University-arranged and supervised school program designed to analyze learning and teaching and to demonstrate, evaluate, and develop teaching skills. *Prereq.* Advanced professional sequence with minimum 2.5 QPA and C- in each certification course.

ED 1420 Student Teaching Practicum for the Pre-K Setting 4 QH

A 150-clock-hour student teaching practicum and related biweekly seminar. Offers extensive participation with supervision in a pre-K program. Students analyze learning and teaching and demonstrate, evaluate, and develop teaching skills while working with young children with diverse backgrounds and needs. *Prereq.* Completion of advanced professional sequence in early childhood education with minimum 2.5 QPA.

ED 1423 Multicultural Education 4 QH

Reviews aspects of the history and culture of different ethnic groups to explore the manner in which certain themes and issues are manifested. Examines and evaluates ethnic and multicultural school curricula in relation to specific educational criteria and goals and their potential impact on learners. Requires students to select and organize historical, literary, and artifact materials from specific ethnic groups and to use them in the planning of learning experiences for classroom use.

ED 1425 Elementary School Mathematics and Science 4 QH

Focuses on methods and materials of mathematics and science teaching for early childhood and elementary education majors. Provides the opportunity for university students to explore various strategies and materials of teaching mathematics and some content areas in science. Takes into account the development stages of children.

ED 1426 Fundamentals of Reading 4 QH

Introduces developmental reading for prospective early childhood and elementary teachers. Studies beginning reading, word recognition, comprehension, and study skills. Introduces materials of instruction, methods of teaching, testing, and grouping.

ED 1470 Freshman Seminar 1 QH

Continues work begun in ED 1101, Introduction to Education, in a series of seminars during the winter and spring quarters. Students prepare an educational plan and are introduced to a number of current educational issues.

ED 1480 Junior/Senior Seminar for Education Majors 1 QH

Examines career development and career management issues of teaching professionals. Discusses important components of the after-graduation job search process, and incorporates advice from professionals in the field. Examines a number of current issues relating to the working conditions of teachers, such as the teacher's union, teacher certification, graduate school, career issues for women, and alternative careers in education.

ED 1800 Directed Study 1 4 QH

This experience is provided for the student whose unique academic needs or interests cannot be adequately satisfied in any of the scheduled courses of the department. Preparation consists of approval of the supervising faculty member and the dean's office. Approval forms must be submitted to the dean's office during the quarter prior to registration for the directed study. *Prereq.* Permission of instructor.

ED 1801 Directed Study 2 4 QH

For students who have completed ED 1800.

English

Unless otherwise indicated, the prerequisite for upperclass courses is a freshman English sequence. For undergraduate students in the full-time day programs this means ENG 1110 and ENG 1111; ENG 1013, ENG 1014, and ENG 1111; ENG 1110, ENG 1014, and ENG 1111. For the College of Engineering, ENG 1111 and ENG 1113, and for international students, ENG 1004, ENG 1005, and ENG 1006.

ENG 1004 Fundamentals of English for Non-Native Speakers 4 QH
Provides intensive practice in composition with accent on accurate, intelligible writing and paragraphs organized around single, well-supported ideas. Encourages sentence-combining and vocabulary development, and gives special attention to individual writing needs. Includes prose readings, class discussion, and selective review of grammar. Pass/fail grading. *Prereq.* *Special placement for non-native speakers whose performance or scores indicate that their writing skills are not yet up to those required for ENG 1005.*

ENG 1005 English for International Students 1 4 QH
Emphasizes the development of skills needed in writing clear, expository prose essays. Requires the regular writing and rewriting of essays of increasing length and complexity. Focuses on appropriate prose readings for discussion and analysis and introduces techniques preparatory to research writing. *Prereq.* *ENG 1004 or special placement.*

ENG 1006 English for International Students 2 4 QH
Introduces the study of literature through close reading and discussion of fiction, nonfiction, and poetry. Advances development of rhetorical techniques by requiring frequent essays written in relation to the readings and rewritten to improve content, organization, and diction. Provides guided experience with using outside sources and library materials for writing a term paper. *Prereq.* *ENG 1005 or equivalent.*

ENG 1013 Fundamentals of English 4 QH
Offers an introduction to principles of the writing process. Emphasizes individualized assistance in generating and developing ideas, drafting, revising, and organizing and mastering the conventions of written English. Pass-fail grading. *Prereq.* *Special placement.*

ENG 1110 Freshman English 1 4 QH
Focuses on the individual student's writing skills. Includes application of important principles of composing, logic, and rhetoric to exposition and argumentation. Reviews sentence structure, punctuation, and paragraphing. Analyzes essay forms and problems.

ENG 1111 Freshman English 2 4 QH
Continues instruction in writing, with emphasis on expository methods of defining, describing, analyzing, persuading, and composing the research paper. Requires students to write lengthy critical essays based on consideration of primary and secondary materials. Focuses on poems, stories, and plays as the subject matter for discussion of writing technique and written assignments. ENG 1111 follows ENG 1110 and is required of all freshmen in the University. *Prereq.* *ENG 1110.*

ENG 1115 Poetry 4 QH
Involves close reading of selected poems, study of critical terms, and practice in different critical approaches to poetry; examines techniques for reading a variety of poetic texts. (II) *Prereq.* *ENG 1110 and ENG 1111 or equivalent.*

ENG 1116 Fiction 4 QH
Involves close reading of selected novels and short stories, study of critical terms, and practice in different critical approaches to fiction. (II) *Prereq.* *ENG 1110 and ENG 1111 or equivalent.*

ENG 1117 Drama 4 QH
Involves close reading of selected plays, study of critical terms, and practice in different critical approaches to drama. (II) *Prereq.* *ENG 1110 and ENG 1111 or equivalent.*

ENG 1118/LIN 1118 Introduction to Language and Linguistics 4 QH
Introduces students to their unconscious linguistic knowledge about sentence structure (syntax), meaning (semantics), word forms (morphology), and speech sounds (phonology). Examines other issues related to language such as the Black English/Standard English debate, women's and men's language, "talking" chimpanzees, "talking" computers, and the nature/nurture controversy. (II)

ENG 1119/LIN 1119 History of the English Language 4 QH
Studies the development of modern English from Anglo-Saxon beginnings; effects of Scandinavian and Norman invasions; dialect geography; evolutionary changes, word formation, and borrowing; and origins of writing and problems of spelling. Readings include both formal and informal writings, literary selections, wills, journals, and private and public letters. (III) *Prereq.* *ENG 1110 and ENG 1111 or equivalent.*

ENG 1120 Survey of English Literature 1 4 QH
Surveys the major British writers and major literary forms and works from the Middle Ages to the end of the eighteenth century. Includes works by such writers as Chaucer, Spenser, Shakespeare, Milton, Pope, and Swift. *Prereq.* *ENG 1110 and ENG 1111 or equivalent.*

ENG 1121 Survey of English Literature 2 4 QH
Surveys the major British writers and major literary movements from the romantic period through the Victorian and modern periods to the present. Includes works by such writers as Wordsworth, Coleridge, Keats, Browning, Tennyson, Yeats, Lawrence, Lessing, and Beckett. *Prereq.* *ENG 1110 and ENG 1111 or equivalent.*

ENG 1123 Survey of American Literature 1 4 QH
Surveys the major American writers and major literary forms and works from the colonial period to the Civil War. Includes works by such writers as Bradstreet, Taylor, Cooper, Poe, Hawthorne, Melville, and Emerson. *Prereq.* *ENG 1110 and ENG 1111 or equivalent.*

ENG 1124 Survey of American Literature 2 4 QH
Surveys the major American writers and major literary forms and works from the Civil War to the mid-twentieth century. Includes works by such writers as Whitman, Dickinson, Twain, James, Hemingway, Fitzgerald, Faulkner, and Wright. *Prereq.* *ENG 1110 and ENG 1111 or equivalent.*

ENG 1125 Technical Writing 4 QH
Trains writers in the clear, unambiguous style of technical writing. Requires students to practice these skills by writing technical proposals, process descriptions, feasibility and program reports, and operators' manuals and by making oral presentations. *Prereq.* *ENG 1110 and ENG 1111 and 80 QH.*

ENG 1126 Backgrounds in English and American Literature 4 QH
Examines in translation Greek, Roman, and biblical literature as

myth, genre, and theme. Readings include Homer, Virgil, Ovid, the most influential parts of the Bible, and Dante. (III) *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1218/LIN 1218 Introduction to Language and Linguistics 2 4 QH

A workshop that focuses on three core areas in the study of language: syntax, morphology, and phonology. Examines the regularities that underlie the linguistic system inside each language user's mind, with a slant toward "doing" linguistics: playing with data, analyzing it, and ultimately explaining it. *Prereq.* ENG 1118/LIN 1118 or permission of instructor.

ENG 1275 Grammar for Journalists 4 QH

Reviews the mechanics of newspaper and magazine prose. Emphasizes grammatical forms, punctuation, spelling, effective structures, and conventional usage. *Prereq.* Journalism majors only.

ENG 1276 Science Fiction 4 QH

Traces the development of various science fiction themes and approaches, from early man versus machine and love/hate relationships to alien close encounters of all kinds. From *Frankenstein* to most recent titles. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1277 Topics in Science Fiction 4 QH

Focuses on a single writer or group of writers (such as Wells or writers of contemporary American science fiction), a theme (such as women in science fiction or the future city), or a unifying idea (such as time travel or utopia/dystopia). *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1278 Modern Bestseller 4 QH

Explores the function of quest, romance, and adventure in a selection of contemporary bestselling fiction. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1279 The Modern Novel 4 QH

Studies the major British and American novelists of the twentieth century. Considers theme and form in such authors as Lawrence, Woolf, Fitzgerald, Ellison, Doctorow, and Didion. (III) *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1280 Modern Drama 4 QH

Studies the development of drama from realism to surrealism, from Ibsen to Beckett. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1281 The Modern Short Story 4 QH

Studies the short story from Poe to the present, including such writers as Joyce and Kafka, Hemingway and Flannery O'Connor. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1283 Contemporary Fiction 4 QH

Examines British and American writers from 1945 to the present, including such figures as Lessing, Burgess, Pynchon, and Barth. Emphasizes experimental and modernist authors. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1285 Literature and the Law 4 QH

Investigates the problems of crime and justice as reflected in literature, from ancient to contemporary works. The secondary focus is the law itself as literature, including explorations of case files and other legal material. The readings encourage students to

discover the changing nature of the criminals—heroes or victims or villains—and to deal with the social, psychological, and political facts that define them. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1286 Literature and Politics 4 QH

Explores how authors from Sophocles to Mailer represent the religious, moral, and ethical conflicts arising from the acquisition, use, and misuse of political power. Considers literature in several categories: utopian, which establishes a conflict between the ideal and the real; satirical, which threatens a power structure by exposing it to scorn; analytic, which describes the rise to and fall from power of individuals, parties, or states; and investigative, which takes the reader inside a power elite to observe its inner operations. Participants examine the difference between the ideal of government and its reality. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1287 The Literature of Science 4 QH

Examines historically the discovery methods and models of literature and science, exploring one or more of the following areas: the relationship of the methods and models of literature and science; the treatment of scientific methods and models in literature; the use of literary devices, techniques, and traditions in scientific texts. Readings will be drawn from historically significant scientific texts, literary texts, or some combination of these. (VI) *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1288 Film and Text 4 QH

Studies either the similarities and differences between literary texts and film versions of those texts or the interrelations between film and literature as means of cultural expression during a specific historical period. For example, students might compare Doctorow's *Book of Daniel* to the film version, *Daniel*, or they might study books and movies of a period like the sixties that reflect the spirit of the era (*Catch-22*, *The Graduate*). *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1289 Shakespeare on Film 4 QH

Examines the various treatments of Shakespeare's plays on film. Treats the technical aspects of film and how these are used by directors to transfer Shakespeare's plays from the stage to the screen. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1290 Topics in Film 4 QH

Studies a theme or problem (film and society, film and politics), a period in film history (American film from 1945 to the present), a film genre (the western, film noir), or a film director (Hitchcock, Coppola). *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1293 Topics in Popular Culture 4 QH

Focuses on such topics as the soap opera, the western, and the police story; on a popular culture activity; or on a popular culture perspective. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1294 Modern Film 4 QH

Studies a selection of major modern films from around the world from a thematic, cultural, and historical perspective. Special attention is given to political, social, ethical, and psychological issues, as well as to the way common human themes emerge in quite diverse cultures. The course also covers the basic procedures of film interpretation. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

- ENG 1300 Topics in Fiction** 4 QH
Studies a particular kind of fiction, such as the novella; a problem in fiction, such as the role of the narrator; a particular group of fiction writers; or a theme in fiction.
- ENG 1307 Approaches to Literature** 4 QH
Examines ancient and modern theories of literature. Includes selections from the criticism of Plato, Aristotle and the Romantics, as well as from Marxist, Freudian, Jungian, and formalist theories.
- ENG 1309 Topics in Literary Criticism** 4 QH
Studies a specific problem method or school of criticism, such as structuralism or archetypal criticism.
- ENG 1340 Writing Workshop** 1 QH
Emphasizes the writing process: multiple drafts, revision, editing, and publication. Students will write one long paper, often in conjunction with an assigned paper in another course, that will be produced in a class booklet at the end of the quarter. *Prereq.* 80 QH and *Pharmacy, Physical Therapy, or Engineering majors.*
- ENG 1350 Intermediate Writing** 4 QH
Provides writing instruction in an interdisciplinary course in which students develop papers on topics relating to their majors. Led by English faculty, students will also read and respond to essays from various disciplines. Writing will be guided in stages from proposal through finished product. *Prereq.* ENG 1110 and ENG 1111 and 80 QH.
- ENG 1351 Creative Writing** 4 QH
Gives the developing writer an opportunity to practice writing various forms of both poetry and prose. Features in-class discussion of student work. *Prereq.* ENG 1110 and ENG 1111 or equivalent.
- ENG 1352 Advanced Writing** 4 QH
Offers an opportunity for experienced writers to hone their skills and develop their interests in different forms and subjects. *Prereq.* ENG 1350 or permission of instructor.
- ENG 1357 Poetry Workshop** 4 QH
Advanced workshop in writing and examining original student poetry. Students experiment in established poetic forms and compose their own work. *Prereq.* ENG 1351 or permission of instructor.
- ENG 1360 Topics in Writing** 4 QH
An upper-level writing course designed for transfer students who have had transfer credit accepted by Northeastern University, but whose performance on the Introductory Writing Program essay indicates that they would benefit from another course in writing. Taken for elective credit, focuses on reading and writing in an academic context. Requires students to write expository essays that allow them to rehearse a number of different writing strategies as they explore a single topic of their choice (in consultation with the instructor) for the entire term. Students are required to keep a portfolio of all their work (from notes to drafts to final essay), a reading notebook, and a grammar log.
- ENG 1361 The Writing Process** 4 QH
Explores writing in theory and practice. Students observe writers at work and tutor students in the Writing Center as part of the course work. *Prereq.* ENG 1110 and ENG 1111 or equivalent and 80 QH.
- ENG 1362 Publication Arts** 4 QH
Acquaints students with basic publishing skills. Each student chooses an area of specialization, such as fiction, medicine, law, or engineering, in order to develop skill in editing manuscripts. *Prereq.* ENG 1110 and ENG 1111 or equivalent.
- ENG 1370 Technical Writing 2** 4 QH
Offers an opportunity for students to develop technical writing skills in a particular subject or form. *Prereq.* ENG 1125 or permission of instructor.
- ENG 1371 Writing for the Computer Industry** 4 QH
Focuses on computer documentation, covering general information and operating and programming instructions. Includes graphics, layout, testing, and revision. *Prereq.* ENG 1125 or permission of instructor and one computer science course.
- ENG 1381 Writing for the Professions: Business Administration** 4 QH
Allows students to gain professional writing experience similar to that of the workplace. Relies on the process approach to writing and features an extended simulation, which integrates common written and oral communication through practical application. *Prereq.* ENG 1110 and ENG 1111 or equivalent.
- ENG 1382 Writing for the Professions: Criminal Justice** 4 QH
Provides students in the College of Criminal Justice with instruction in writing a variety of professional forms. *Prereq.* ENG 1110 and ENG 1111 or equivalent.
- ENG 1400 Topics in Genre** 4 QH
Explores the characteristics of a particular literary form over time through works by various authors. *Prereq.* ENG 1110 and ENG 1111 or equivalent.
- ENG 1401/LIN 1401 Introduction to Syntax** 4 QH
Offers an introduction to syntax, the structural rules of a language. Develops and tests syntactic theory which, like other scientific theories, seeks to explain why things are the way they are. The question underlying the investigation is: how do the structures of language relate to the structure of the human mind? (V) *Prereq.* ENG 1110 and ENG 1111 or equivalent.
- ENG 1402/LIN 1402 Grammars of English** 4 QH
Provides a study of the rules of sentence construction in English, contrasting the traditional framework with current linguistic models. Students will have the opportunity to prepose, postpose, and extrapose as they learn to manipulate grammatical constructs. *Prereq.* ENG 1110 and ENG 1111 or equivalent.
- ENG 1407/LIN 1407 Introduction to Semantics** 4 QH
Focuses on meaning and how it is expressed in language—through words, sentence structure, intonation, stress patterns, and speech acts. How do content, logic, and speakers' and listeners' assumptions affect what sentences can mean? In what ways is linguistic meaning determined by our perceptual system or our culture? *Prereq.* ENG 1110 and ENG 1111 or equivalent.
- ENG 1408/LIN 1408 Topics in Linguistics** 4 QH
Examines closely one of a range of topics from the perspective of current linguistics: American dialects, language and law, women's and men's language, words and word structures, or issues in linguistics and literature. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1409 American Novels 1**4 QH**

Focuses on the themes, forms, and techniques of major American novelists of the nineteenth and early twentieth centuries, such as Cooper, Hawthorne, Melville, Twain, and James. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1410 American Novels 2**4 QH**

Studies the modern and contemporary American novel. Considers such writers as Cather, Hemingway, Fitzgerald, Faulkner, Bellow, and Baldwin. (III) *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1411 English Drama 1**4 QH**

Surveys representative English drama, excluding Shakespeare, from *Everyman* to Goldsmith and Sheridan. Analyzes dramatic forms as well as the role of the Elizabethan theaters, dramatic conventions, audience content, and acting styles in Restoration farces. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1412 English Drama 2**4 QH**

Surveys representative English drama of the nineteenth and twentieth centuries. Charts the development of the genre from the nineteenth century to the present and discusses themes and forms. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1550 Psychology and Literature**4 QH**

Concentrates on twentieth-century novels and short stories that stress individual behavior and motivation and reveal human mental and emotional processes. Includes such writers as Kafka, Dostoevski, Faulkner, Conrad, and Lawrence. Same as INT 1707.

ENG 1551 Gender Roles in Literature**4 QH**

Investigates the relation between sex roles and literary portrayals. Selections represent male and female writers and provide a culturally comparative perspective. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1552 Fantasy**4 QH**

Studies the theory and practice of fantasy as found in the works of such writers as Swift, Carroll, C.S. Lewis, Orwell, and Tolkien. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1557 Topics in Fantasy**4 QH**

Explores such areas as dreams, nightmares, and borderline states of consciousness in the works of such writers as Poe and Kafka. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1558, ENG 1559 Literature in Context**4 QH each**

Attempts to place the writer in the context of a special theme. For example, students might discuss a group of authors influenced by their common interest in psychoanalysis, by their social consciousness, or by an interest in the Wild West and the settlement of America. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1600, ENG 1601 Topics in Literature**4 QH each**

Experiments with subjects and themes such as the censored novel, the Holocaust, alienation, and popular song lyrics. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1602, ENG 1607 Major Figure**4 QH each**

Examines in detail the work of one writer such as Mark Twain, Virginia Woolf, or Eugene O'Neill. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1608 The City in Literature**4 QH**

Examines the city in literature as it has been depicted from ancient times to the present, from Plato to Barthelme. Discusses such themes as the city as a locus of evil, the city as a place of possibility, and the city as a center of art and an influence on creative form in an interdisciplinary fashion. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1609 Contemporary American Literature**4 QH**

Studies major movements in American poetry and fiction since 1945. Considers such poets as Plath, Ginsberg, and Ashbery, and such novelists as Morrison, Pynchon, and Vonnegut. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1610 Early American Literature**4 QH**

Examines American literature of the colonial and federal periods, including Bradford, Taylor, Edwards, Franklin, Wheatley, Irving, and Bryant. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1611 New England Renaissance**4 QH**

Studies the development of a native tradition in the context of democratic and romantic attitudes toward experience and the paradox these attitudes reveal. Includes such writers as Emerson and Thoreau, Hawthorne, and Melville. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1612 American Realism**4 QH**

Examines the realistic tradition in American literature, including local color and native humor, from the end of the Civil War to the turn of the century. Includes such writers as Twain, James, Howells, Crane, and Norris. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1617 Modern American Literature**4 QH**

Studies major developments in American poetry and fiction from 1900 to 1945. Considers such poets as Frost, Eliot, Stevens, and Moore, and such novelists as Hemingway, Faulkner, Fitzgerald, and Porter. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1618 Children's Literature**4 QH**

Studies the history of children's literature in the English language, with special attention to matters such as genre theory and critical approaches. Includes such works as *Alice in Wonderland*, *Uncle Remus*, *Little Women*, and *The Wizard of Oz*. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1619 Topics in Children's Literature**4 QH**

Focuses closely on a specific collection of stories (such as *Grimm's Fairy Tales*), on a specific genre (such as boys' books), on a specific issue (such as the problem of evil), or on children's literature as a form of group socialization. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1621 Nineteenth-Century British Fiction**4 QH**

Studies theme and form in the major English novels of the nineteenth century, considering such authors as the Brontës, Charles Dickens, George Eliot, and Thomas Hardy. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1622 Major Twentieth-Century British Novelists**4 QH**

Introduces students to British fiction from Joseph Conrad to John Fowles, including such writers as D.H. Lawrence, Virginia Woolf, and others less well known. The aim of the course is to

show how novels as artistic creations shape their own worlds while helping us to understand ourselves. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1627 Medieval English Literature 4 QH

Surveys the major works of medieval English literature. Includes works such as *Sir Gawain*, *Piers Plowman*, and *Pearl*. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1628 Chaucer 4 QH

Surveys the work of Chaucer, with particular emphasis on the *Canterbury Tales*. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1629 Topics in Chaucer 4 QH

Examines closely a particular work or group of works (such as *Troilus and Criseyde*) or a theme (such as Chaucer's symbolism). *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1630 Milton 4 QH

Concentrates on Milton's *Paradise Lost*, with supplementary readings in his minor poetry and prose. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1631 Topics in Medieval Literature 4 QH

Focuses on a genre (such as romance or debate literature), a theme (such as alchemy or King Arthur), or other narrow topics. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1632 Sixteenth-Century Literature 4 QH

Concentrates on sonnets, love lyrics, and erotic narrative poetry, principally by Wyatt, Sidney, Marlowe, Spenser, and Shakespeare. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1637 Seventeenth-Century English Literature 4 QH

Examines major writers of the period, such as Bacon and Jonson, Donne and Herbert, Milton and Dryden. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1639 Eighteenth-Century English Literature 4 QH

Surveys the Augustan age of comic masterpieces. Includes such major writers as Pope, Addison, Steele, Swift, Goldsmith, Burns, Johnson, and Boswell. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1640 Topics in Eighteenth-Century Literature 4 QH

Examines closely a single writer or group of writers (such as Fielding or the essayists), a genre (such as satire), a theme (such as reason and madness), or other narrow topics. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1641 Romantic Poetry 4 QH

Surveys the development of English Romantic poetry, both in its lyric and longer forms, in Blake, Wordsworth, Coleridge, Byron, Shelley, and Keats. Emphasizes problems of belief and the relationship of the individual to the surrounding world of natural, social, and historical process. (V) *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1647 Victorian Literature 4 QH

Surveys the major issues and writers of Victorian England, considering such writers as Tennyson and Browning, Dickens and the Brontës, G.M. Hopkins, and Oscar Wilde. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1648 Topics in Victorian Literature 4 QH

Examines closely a single writer or group of writers (such as Arnold or the fantasists) or a theme (such as the movement toward modernism or decadence). *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1649 World Literature 1 4 QH

Surveys world literature from the time of the Greeks through the Renaissance, from Homer to Cervantes. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1650 World Literature 2 4 QH

Surveys world literature from the Renaissance through the modern period, from Voltaire to Brecht. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1652 Twentieth-Century English Literature 4 QH

Surveys the best and most interesting work of twentieth-century British writers such as William Butler Yeats, D.H. Lawrence, W.H. Auden, Doris Lessing, and Iris Murdoch. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1658 Introduction to Shakespeare 4 QH

Covers a selection of the major plays of Shakespeare, including both tragedies and comedies. (III) *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1659 Shakespeare's Comedies 4 QH

Studies the romantic comedies, problem comedies, and romances, ranging from *The Merchant of Venice* to *The Tempest*. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1660 Shakespeare's Tragedies 4 QH

Studies the nature of the tragic hero, the questioning of social norms, and the landscape of chaos, ranging from *Julius Caesar* to *Coriolanus*. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1661 Topics in Shakespeare 4 QH

Examines closely such topics as the history plays, Shakespeare in performance, the Shakespearean hero, and psychological approaches to Shakespeare. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1662 The Bible 4 QH

Studies books of both the Old Testament and the New Testament as literature and as history. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1667 Modern Poetry 4 QH

Studies the modernist tradition in American and British poetry. Considers such writers as Yeats, Hardy, Frost, Eliot, Stevens, Pound, Williams, and Cummings. (III) *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1677 Contemporary Poetry 4 QH

Studies developments in British and American poetry since 1945. Includes such writers as Plath, Ginsberg, Lowell, Bly, Ashbery, and Heaney. (VI) *Prereq.* ENG 1110 and ENG 1111 or equivalent.

ENG 1678/AFR 1121 Early African-American Literature 4 QH

Surveys the development and range of black American writers, emphasizing poetry and prose from early colonial times to the Civil War. *Prereq.* ENG 1110 and ENG 1111 or equivalent.

- ENG 1679 Modern African-American Literature** 4 QH
Surveys the development and range of black American writers, emphasizing poetry and prose from the post-Civil War period to the present. *Prereq.* ENG 1110 and ENG 1111 or equivalent.
- ENG 1690, ENG 1691 Junior/Senior Seminar** 4 QH each
(First preference given to students needing the course to complete the major.) Explores an important aspect of literature such as the writer and the audience, the tradition of the new, style and meaning, and the jazz age. Emphasizes independent research in a seminar setting. *Prereq.* ENG 1110 and ENG 1111 or equivalent and junior/senior status.
- ENG 1692/LIN 1692, ENG 1693/LIN 1693 Junior/Senior Seminar in Linguistics** 4 QH each
Explores important aspects of literature such as the writer and the audience, the tradition of the new style and meaning, and the jazz age. Emphasizes independent research in a seminar setting. *Prereq.* ENG 1110 and ENG 1111 or equivalent and junior/senior status.
- ENG 1710 Freshman English 1 (Honors)** 4 QH
Honors equivalent of ENG 1110.
- ENG 1711 Freshman English 2 (Honors)** 4 QH
Honors equivalent of ENG 1111.
- ENG 1721 Survey of English Literature 2 (Honors)** 4 QH
Honors equivalent of ENG 1121.
- ENG 1723 Survey of American Literature 1 (Honors)** 4 QH
Honors equivalent of ENG 1123.
- ENG 1725 Technical Writing (Honors)** 4 QH
Honors equivalent of ENG 1125.
- ENG 1750 Intermediate Writing (Honors)** 4 QH
Honors equivalent of ENG 1350.
- ENG 1758 Introduction to Shakespeare (Honors)** 4 QH
Honors equivalent of ENG 1658.
- ENG 1781 Writing for Business (Honors)** 4 QH
Honors equivalent of ENG 1381.
- ENG 1810, ENG 1811 Directed Study** 4 QH each

Geology

- GEO 1119 Marine Resources** 4 QH
Provides a qualitative and quantitative survey of renewable and nonrenewable resources from the sea. Aspects covered include offshore oil and gas utilization, marine minerals, tidal power, and coastal zone recreational resources, including polluted beaches and artificial fishing reefs.
- GEO 1120 Physical Oceanography** 4 QH
Provides a description of the physical properties and composition of sea water, waves, tides, and ocean currents. Discusses how these properties are measured by oceanographers and how they influence the earth's environment and climate.
- GEO 1121 Biological Oceanography** 4 QH
Covers the productivity of animal and plant life in the various zones of the ocean and the growing economic importance of the oceans as a source of food for the expanding world population.
- GEO 1122 New England Fishery Resources** 4 QH
Provides an overview of the fisheries industry of New England. Emphasizes environmental factors controlling the distribution, quality, and abundance of fisheries resources. Discusses the methods and the effects of direct human utilization of the resource as well as the indirect effects of pollution and habitat modification.
- GEO 1128 Geology of Oceans and Coasts** 4 QH
Examines the relationship between the form of the ocean basins and their margins and the major processes forming them. Emphasizes local landforms, including New England beaches, spits, barrier islands, and the continental shelf. (II)
- GEO 1140 Environmental Geology** 4 QH
Discusses how geologic processes acting at the Earth's surface interact with the human environment. Topics include river and ocean flooding, coastal erosion, landslides, land-use planning, and waste disposal.
- GEO 1141 Geological Hazards and Resources** 4 QH
Discusses how geologic processes originating deep inside the Earth interact with the human environment. Topics include global crystal movements, volcanic and earthquake hazards, mineral resources, coal and oil, geothermal energy, resource management, and disposal of radioactive wastes. (II)
- GEO 1154 Planetary Astronomy** 4 QH
Focuses on astronomy of the solar system. Topics include description of the planets and other objects, with discussion of how our understanding has evolved from the days of naked-eye observation to the present era of interplanetary probes. (V)
- GEO 1208 Age of Dinosaurs** 4 QH
Focuses on major physical and biological events of the Mesozoic Era of earth history. Draws on evidence from the sedimentary rock record to provide a basis for interpretations of Mesozoic life, climates, mountain building, and paleogeography. Demonstrates principles of evolution and extinction through dinosaur paleobiology and history.
- GEO 1212 Physical Geology** 4 QH
Offers a systematic study of the materials comprising the Earth. Emphasizes the processes that form, transport, alter, and destroy rock, as well as the nature and development of landscape. (II)
- GEO 1213 Physical Geology Laboratory** 1 QH
Optional lab for GEO 1212. Exercises pertain to mineral and rock identification and topographic and geologic map interpretation. Required for geology majors. *Prereq.* GEO 1212; may be taken concurrently.
- GEO 1222 Historical Geology** 4 QH
Traces the physical and biological history of the earth through geologic time. Major topics are the origin and evolution of life, mountain building, and continental drift. (II)
- GEO 1223 Historical Geology Laboratory** 1 QH
Studies fossil representatives of major invertebrate phyla, application of fossils to studies of rock sequences, interpretation of geologic history from geologic maps and sedimentary rocks. *Prereq.* GEO 1222; may be taken concurrently.

- GEO 1250 Advanced General Geology** 4 QH
Offers an introduction to new and advanced concepts, theories, and hypotheses in geology through discussions, research papers, and individual projects. *Prereq.* GEO 1212 and GEO 1222.
- GEO 1308 Petrology** 5 QH
Studies the hand specimen and field identification of the common igneous, sedimentary, and metamorphic rocks. Considers the modes of origin and important properties of common rock types. *Prereq.* GEO 1212.
- GEO 1310 Descriptive Mineralogy** 5 QH
Provides a study of mineralogy, including crystallography and physical, chemical, and descriptive mineralogy of the common rock-forming minerals. *Prereq.* Two quarters of chemistry.
- GEO 1311 Optical Crystallography** 5 QH
Studies the theory and practical methods of optical crystallography, including the basic techniques for determining the optical constants of crystals using the polarizing microscope and immersion media. *Prereq.* GEO 1310.
- GEO 1312 Petrography** 5 QH
Covers description and identification of rocks and rock-forming minerals using thin-sections and the petrographic microscope; discussion of textural and mineralogic relationships. *Prereq.* GEO 1311.
- GEO 1320 Field Geology** 4 QH
Focuses on field techniques as a working guide for the approach, pursuit, and solution of geologic problems. Considers such techniques as geologic map construction, stratigraphic section measurement, and field rock description. Lab consists of field research at a quarry, roadcut, or other geologic exposure. *Prereq.* GEO 1212.
- GEO 1412 Geochemistry** 4 QH
Offers an evaluation of chemical processes important in the various geologic environments and their effects on the development of the lithosphere. *Prereq.* One year of chemistry.
- GEO 1414 Igneous and Metamorphic Petrology** 5 QH
Covers the origin and distribution of igneous and metamorphic rocks as interpreted from their chemistry, mineralogy, and field relationships. Lab includes field and petrographic analysis of rock suites. *Prereq.* GEO 1312.
- GEO 1418 Structural Geology** 5 QH
Covers the description and origin of large- and small-scale rock structures with emphasis on interpretation of the mechanics of deformation. Field and lab analyses of structural problems using maps, models, and rock specimens. *Prereq.* GEO 1212 and GEO 1213.
- GEO 1420 Geophysics** 4 QH
Studies the basic techniques of reflection and refraction seismology, gravity, aeromagnetic, and heat-flow techniques and the information they provide on the structure, composition, and dynamics of the Earth's interior. Emphasizes the application of these techniques to the search for economic minerals in the earth's crust. *Prereq.* PHY 1231.
- GEO 1424 Stratigraphy** 5 QH
Offers a study of paleoenvironments and sedimentary-basin analysis based on sedimentary structures, stratigraphic sequences, and fossils. Emphasizes use of geologic sections, drill-cores, and well-logs. Includes lab interpretation of sedimentary rock suites, maps, and sections. *Prereq.* GEO 1222.
- GEO 1428 Invertebrate Paleontology** 5 QH
Surveys major invertebrate phyla preserved in the fossil record. Discusses micro- and macro-evolutionary principles with consideration of adaptive and functional morphology and the role of paleoenvironments. Lab involves description and classification of fossil invertebrates.
- GEO 1430 Sedimentation and Sedimentary Environments** 5 QH
Describes the physical processes of sedimentation and their role in the interpretation of modern and ancient sedimentary environments. Lab concentrates on the interpretation and description of the physical and textural properties of sediments and sedimentary rocks.
- GEO 1432 Sedimentary Petrology** 5 QH
Covers origin, classification, and petrography of the major groups of sedimentary rocks. Discusses the environments of deposition of the nonclastic rocks. Lab concentrates on thin-section study of sedimentary rocks. *Prereq.* GEO 1311.
- GEO 1435 Coastal Processes** 5 QH
Examines the effect of coastal marine processes and the resultant coastal responses. Topics include the dynamics of waves and currents and the associated erosion, transportation, and deposition of sediment, forming beaches, barrier islands, and cliffed structures. *Prereq.* GEO 1212.
- GEO 1436 Marine Geology** 4 QH
Compares the balance between major sedimentary and tectonic forces in ocean basins and margins to resulting ocean form. Topics include origin of continental shelves, shelf sedimentation and transport, deep-sea processes and sediments. Evaluates resource development of OCS oil, sand and gravel, and manganese nodules. *Prereq.* GEO 1212.
- GEO 1438 Geology and Land-Use Planning** 4 QH
Studies the causes and solutions of geologic environmental problems related to land use. Topics include the causes and prevention of land-use problems in areas of existing or potential landslides, subsidence, erosion, flooding, and groundwater pollution. *Prereq.* GEO 1140, GEO 1212, or permission of instructor.
- GEO 1440 Geomorphology** 5 QH
Focuses on the origin and evolution of landscape features by processes operating at or near the Earth's surface. *Prereq.* GEO 1212.
- GEO 1442 Water in Environmental Planning** 4 QH
Examines aspects of surface runoff from geomorphic and hydrologic perspectives. Develops methods for description and calculation of major river and drainage basin processes and applies the results to the planning process. Examines human modification of these systems, including urbanization, dams, and channelization, and applies this information to an understanding of regulatory processes. (VI) *Prereq.* GEO 1212 or permission of instructor.

GEO 1444 Glacial and Pleistocene Geology**5 QH**

Covers the processes of ice movement and the characteristics and distribution of erosional and depositional structures associated with past and present glaciers; introduces Pleistocene chronology and correlations. *Prereq.* GEO 1222.

GEO 1446 Hydrogeology**4 QH**

Covers origin, distribution, and flow of groundwater in permeable sediments and bedrock; hydrological and geological characteristics of aquifers; regional flow systems emphasizing rock structure, stratigraphy, and other aspects of the geological environment; principles of hydrogeology mapping and analysis; and introduction to well design and well hydraulics. *Prereq.* GEO 1212, MTH 1107 or 1123, or permission of instructor.

GEO 1447 Groundwater Modeling**4 QH**

Uses computers to solve problems in the flow of groundwater. Develops concepts of groundwater flow. Uses the finite-difference method to model steady-state and transient flow. Programs are supplied by the instructor so programming skill is not a prerequisite. *Prereq.* Introductory calculus.

GEO 1448 Groundwater Geochemistry**4 QH**

Investigates important geological processes (formation of soil, ore deposits, caves, sinkholes) that occur when groundwater interacts with rock or soil, modifying groundwater chemistry and affecting water quality. Examines groundwater contamination and dispersion, isotope tracer studies, field sampling, and analytical methods. *Prereq.* Two quarters of chemistry.

GEO 1450 Geology Seminar**4 QH**

Offers in-depth study, on an individual or small-group basis, of a selected geologic topic. Requires both oral and written presentations. *Prereq.* Major in geology or senior status.

GEO 1712 Physical Geology (Honors)**4 QH**

Honors equivalent of GEO 1212. (II)

GEO 1722 Historical Geology (Honors)**4 QH**

Honors equivalent of GEO 1222. (II)

GEO 1754 Planetary Astronomy (Honors)**4 QH**

Honors equivalent of GEO 1154. (V)

GEO 1816, GEO 1817 Undergraduate Research**4 QH each**

Offers independent research on a selected topic under the direct supervision of a faculty member. *Open only to juniors and seniors majoring in geology, with the recommendation of the supervising faculty member and of the department.*

GEO 1820, GEO 1821 Directed Study**4 QH each**

Offers independent study of a specific topic not normally contained in the regular course offerings, but within the area of competence of a faculty member. *Open to all students with the recommendation of a faculty member and departmental approval.*

GEO 1824, GEO 1825 Special Studies**1 QH each**

Offers independent study of a specific topic. *Open to all students with the recommendation of a faculty member and departmental approval.*

GEO 1830, GEO 1831, GEO 1832, GEO 1833**4 QH each****Junior/Senior Honors Project**

For details contact the honors office.

History**HST 1101 Western Civilization to 1648****4 QH**

Surveys Western lifestyles, events, institutions, and culture from the earliest human societies through the end of the Thirty Years War. Focuses on Bronze Age civilizations and the origins of universalist religions, Greco-Roman civilization, early Christianity, Islam, the Germanic and Arab successor states to Rome, medieval civilization, the Renaissance and the age of exploration, the Protestant and Catholic reformations, the religious wars that ensued, and the economic transformations that occurred simultaneously. Emphasizes those elements that influenced the development of Western civilization and values. *Not open to students who have completed HST 1121, HST 1701, or HST 4110.* (II)

HST 1102 Western Civilization since 1648**4 QH**

Surveys the development of Western—largely European—society and values from the rise of the dynastic and bureaucratic states to current Soviet reforms and the integration of the western European economy. Covers royal absolutism, the rise of the scientific world view, the political and economic revolutions that transformed Europe at the end of the eighteenth century, the development of nationalism and Marxism, the race for colonies, the cultural transformations of the early twentieth century, World War I and the Russian Revolution, the crisis of capitalism and the rise of fascism, World War II and the Holocaust, the Cold War and decolonization, and the current state of Western civilization. *Not open to students who have completed HST 1122, HST 1702, or HST 4111.* (II)

HST 1121 World Civilization to 1648**4 QH**

Surveys the development of human institutions from ancient times through the crisis of the mid-seventeenth century. Emphasizes the continuities and changes that occur within civilization and the similarities, differences, and relationships that exist among contemporary civilizations around the world. Covers such topics as the rise of the world's great religions, the military and trading relationships among the various regions of the ancient and medieval worlds, the economic and technological revival of Europe in the early modern period, and the expanding struggle for resources in the crisis atmosphere of the seventeenth century. *Not open to students who have completed HST 1101 or HST 1701, or HST 4110.* (IV)

HST 1122/IAF 1122 World Civilization since 1648**4 QH**

Examines the world from 1648 to the present. Emphasizes the intellectual, technological, and political expansion of Europe and the reactions of the rest of the world. Covers such topics as the global development of modern dynastic and bureaucratic states; the expansion of the European economy with its attendant trade wars; imperial expansion and the explosion of the slave trade; the development and reaction of American Indian, Asian, and African civilizations to that imperialism; the sporadic extension and eclipse of colonialism; and the growing tensions between traditional patterns of loyalty and authority and national, regional, and even global systems and cultures as we approach the twenty-first century. *Not open to students who have completed HST 1102, HST 1702, or HST 4111.* (IV)

HST 1201 The United States to 1877**4 QH**

Focuses on the history of the American people from 1763 to 1877, with an analysis of the American Revolution and the major political, constitutional, diplomatic, economic, and social problems of the new nation. (II)

- HST 1202 The United States since 1877** 4 QH
Continues the survey of American history, with discussion of the emergence of an industrial economy, an urban society, world responsibility, and expanded federal government. (II)
- HST 1241 The Historian's Craft** 4 QH
Examines the ways in which the historian studies the past and the nature of historical statements. Problems considered include research techniques, changing conceptions of historical knowledge, and the relation between the historian and the society in which he/she works. (II)
- HST 1270 Introduction to Public History** 4 QH
Explores the field of public or applied history by surveying its components, including historic preservation, oral history, historical editing, historical archeology, genealogy, family history, business history, local history, material culture, historical resource management, museology, historical research for media, archival management, management of nonprofit organizations, and policy history.
- HST 1301 Topics in European History (Group A or B)** 4 QH
Covers topics in European history from antiquity to the present.
- HST 1321 Medieval Europe (Group A)** 4 QH
Studies Europe from the fall of Rome to the fifteenth century; the expansion of Christianity; the growth of the power of the papacy; the development of monarchies; popular culture, heresy, and witchcraft; crusades; cathedrals, warriors, and saints. Emphasizes cultural and intellectual change. (III)
- HST 1331 Renaissance Civilization (Group A)** 4 QH
Focuses on Europe from 1300 to 1600. Topics include political, economic, and social changes; advances in technology, science, and warfare; overseas expansion; changes in artistic vision; and struggles over religious and scientific beliefs. Emphasizes cultural and intellectual change. (III)
- HST 1355 Tudor England (Group A)** 4 QH
Provides a study of England from the late fifteenth to the early seventeenth century. Topics include an examination of the Tudor contribution to the development of political and social institutions; the Protestant Reformation and the relation between religion and politics; social and economic changes and their relation to the Elizabethan Renaissance. Particular emphasis is placed on intellectual and cultural developments and England's relation to Europe and the New World. Provides hands-on experience with Tudor sources.
- HST 1390 Population in European History (Group A or B)** 4 QH
Examines, through population studies, the causes and consequences of changes in human birth, death, marriage, and migration rates from the Old Stone Age to the late twentieth century. Discusses the interaction and impact of climate change, epidemic disease, war, economic development, and political policy, as well as changes in the structure and function of human family and child-rearing systems. (III)
- HST 1393 History of Science and Technology (Group A or B)** 4 QH
Offers an interdisciplinary survey of the development of science and technology, integrating theories of the philosophy and sociology of science within a historical framework. Emphasizes the environmental and ideological conditions that contribute to the birth and growth of the various sciences and to the relation between these conditions and technological innovation.
- HST 1395 History of Flight and Space Travel (Group A, B, or C)** 4 QH
Traces the history of nonpowered flight, beginning with the dreams of flight of the ancient Greeks and Leonardo da Vinci; from the balloon experiments of the Montgolfier brothers to contemporary hang gliders; powered flight from the Wright brothers to the SST; and rocketry and space travel from its earliest beginnings to "Enterprise."
- HST 1407 Europe, 1870-1921 (Group B)** 4 QH
Focuses on Europe from the Franco-Prussian War to the post-World War I settlement: the growing tensions and rivalries and the declining certainties of the end of the nineteenth century, the origins of World War I, the war itself, the Russian Revolution, and the Peace of Paris.
- HST 1408 Europe since 1921 (Group B)** 4 QH
Focuses on Europe from the Versailles Settlement: the rise of totalitarianism, the Depression, the crises of liberalism and of the European mind, the Appeasement Era, World War II, the Cold War, the end of colonialism, and Europe today.
- HST 1424 Victorian England (Group B)** 4 QH
Discusses the economic, social, and political life of the English people during Victoria's reign. (IV)
- HST 1425 The Decline of Great Britain (Group B)** 4 QH
Discusses the economic, social, and political life of the English people in the twentieth century. (IV)
- HST 1433 The French Revolution and Napoleon (Group B)** 4 QH
Examines the history of France in the age of the *ancien regime* and the Enlightenment as background for the French Revolution and Napoleon.
- HST 1441 Hitler's Germany (Group B)** 4 QH
Offers a study of the origins and nature of Hitler's Third Reich, emphasizing the personal lives of Nazi leaders in an attempt to understand how seemingly ordinary people could enthusiastically promote wars of aggression and revel in genocidal policies.
- HST 1472 The Family in European History (Group B)** 4 QH
Examines issues in the history of the European family from the late Middle Ages to the present. Topics include marriage and sexuality, child-rearing practices, the effect of industrialization and revolution on family life, the Victorian family, and the evolution of the modern family. Students will prepare their own family histories.
- HST 1473 Women in Modern Europe (Group B)** 4 QH
Examines the history of women in Western Europe from the French Revolution of 1789 to the present, focusing on France, Britain, and Germany. Topics explored include women in revolutionary movements, the impact of industrialization on women and the family, women in the labor movements, the struggle for suffrage, and the effects of world wars on women.
- HST 1481 The Culture of Europe (Group B)** 4 QH
Provides an analysis of the culture of the West in the nineteenth and twentieth centuries, focusing on the conjunction of social, cultural, and psychological forces that encouraged or retarded creativity. Considers the interconnections among the arts, social sciences, and sciences within each of the periods covered. (III)

HST 1485 Communism and Revolution (Group B)**4 QH**

Focuses on the history of socialism and revolution from the early nineteenth-century utopias to the New Left of the 1960s.

HST 1490/INT 1150/SOC 1150 Introduction to Women's Studies: Image, Myth, and Reality (Group B or C)**4 QH**

Introduces the issues and methodology involved in the interdisciplinary study of women. Encompasses the historical, political, economic, and social processes that have created both the image and the reality of women in society. Uses guest lecturers to provide an overview of the many disciplinary approaches to the study of women. This course is required for women's studies minors and can be used as a general elective or, depending on the discipline of the coordinator, to satisfy specific concentration requirements. (II)

HST 1491 Modern Western Economic History (Group B or C)**4 QH**

Surveys the development of the Western world within the framework of economic theory, with attention to social and political ramifications. (III)

HST 1493 Work and Leisure (Group B or C)**4 QH**

Examines the historical evolution of contemporary patterns of work and leisure across cultural, sexual, and class lines. Topics include the impact of machine technology on the worker and the workplace, workers organizing in unions and professional groups, changing concepts of the use of time, women's work and women's leisure; recreation and sports (both participant and spectator); and the rise of the cafe and the saloon as sociable institutions. (III)

HST 1494 History and Film (Group B or C)**4 QH**

Explores various historical issues as seen through the eyes of historians and filmmakers. Presents both acted and documentary films in combination with readings from a variety of source and interpretive materials. (II)

HST 1495 Technological Transformations of Society (Group B, C, or D)**4 QH**

Examines the relation between technological innovations and the world in which they take place. Discusses conditions necessary for discovery and innovation and the impact of technology on political, economic, and social environments.

HST 1496 War in the Twentieth Century (Group B, C, or D)**4 QH**

Provides an analysis of the causes, prosecutions, and effects of the major wars fought in the twentieth century, concentrating on the First and Second World Wars and on the Vietnam War. Using film, simulations, and other materials, classes explore the economic, social, cultural, and psychological impacts of these wars as well as their political, diplomatic, and material aspects.

HST 1497 The World since 1945 (Group B, C, or D)**4 QH**

Offers a thematic study of issues and movements that have influenced the world's history since the end of the Second World War. Subjects include the Cold War, the end of colonialism, urbanization, technology and ecology, cultures and counter-cultures, the "global village," and the prospects for human liberation.

HST 1501 Topics in American History (Group C)**4 QH**

Covers special topics in the history of the people of the United States from 1789 to the present.

HST 1510 Colonial America (Group C)**4 QH**

Covers the discovery and exploration of the New World, the settlement of the English colonies on the North American mainland, their development to 1763, and the origin of their clash with England. (III)

HST 1511 The American Revolution (Group C)**4 QH**

Focuses on the coming of the American Revolution, its nature and progress, and its political, economic, and social aftermath.

HST 1514 The Civil War and Reconstruction (Group C)**4 QH**

Focuses on the events surrounding the southern effort to expand slavery into the territories which led to the Civil War. Emphasizes the significant impact of Abraham Lincoln upon the war's outcome. Also examines Reconstruction, the effort to reunite the North and South at war's end, and explores the major role that African-Americans played throughout the period.

HST 1516 The United States, 1898-1939 (Group C)**4 QH**

Examines social, economic, political, and diplomatic changes from the Progressive Era through the Great Depression and the New Deal.

HST 1517 The United States, 1939-1960 (Group C)**4 QH**

Examines social, economic, political, and diplomatic changes from the start of World War II to the election of John F. Kennedy.

HST 1518 The United States since 1960 (Group C)**4 QH**

Examines social, economic, political, and diplomatic changes in the United States since 1960.

HST 1525/AFR 1131 African-American History 1 to 1900 (Group C)**4 QH**

Covers the development of black America from slavery through the Booker T. Washington-W.E.B. DuBois controversy, with emphasis on the historical links between Africa and America that have shaped the African-American experience. Includes in-depth discussion of slavery's impact, the role of the antebellum free black, the Civil War and Reconstruction, and the black response to the new racism of the late nineteenth century. (III)

HST 1526/AFR 1132 African-American History 2 since 1900 (Group C)**4 QH**

Examines the modern development of black America, with major emphasis on the twentieth century and the rising tide of African-American nationalism. Provides an historical perspective regarding key contemporary issues, including the founding of the NAACP, the Marcus Garvey back-to-Africa movement, the Harlem Renaissance, the Black Muslims, the impact of Martin Luther King, and the idea of Black Power.

HST 1531 New England History (Group C)**4 QH**

Examines the history of New England from its first settlement by Native Americans to its condition in the late twentieth century. Encompasses a variety of topics, including geography, discovery, exploration, settlement, immigration, politics, industrialization, transportation, and urbanization.

HST 1533 History of Boston (Group C)**4 QH**

Explores the history of Boston from colonial times to the present, with attention to the topographical growth and the ethnic composition of the city.

HST 1538 History of Latinos(as) in the United States (Group C)**4 QH**

Examines the history and experiences of the major Latino subgroups—Chicanos, Cubans, and Puerto Ricans—and the new immigrants from Central America and the Caribbean. Studies his-

torical events in the context of the larger "American"—North and South—experiences. Topics include United States' expansion and imperialism in the Southwest and the Caribbean; migration patterns; forms of ethnic nationalism; political participation and mobilization; migratory labor and immigration policies; gender and class distinctions; cultural expressions; the effects of post-industrialization and economic restructuring; and interethnic relations.

HST 1539 American Jewish History (Group C) 4 QH
Examines Jewish political, social, and cultural history from the arrival of the first group of Jews at New Amsterdam in 1654 to the present. Themes covered include immigration, assimilation, family life, religion, anti-Semitism, Zionism, the Holocaust, and American-Israeli relations.

HST 1543 American Urban History (Group C) 4 QH
Examines the development of urban society in the United States in the nineteenth and twentieth centuries, with emphasis on the effects of immigration and industrialization upon the politics, thought, and society of American cities. (VI)

HST 1544 Environmental History of the United States (Group C) 4 QH
Examines American attitudes and practices toward natural and artificial environments from the first exploration to the present, paying special attention to literature, art, and landscape design. (VI)

HST 1548 American Cultural History to 1860 4 QH
Studies the major issues in the cultural history of the United States from the seventeenth century to 1860. Topics covered include popular religion, the rise of republicanism, leisure and play, foodways, cross-currents of popular and elite literature and material culture, geographic sectional differences, and the crusade for the Union. Emphasizes the interaction of working-class, middle-class, and elite cultural forms, including music, sermons, literature, prints and paintings, and material culture.

HST 1549 American Popular Cultural History since 1860 4 QH
Studies the major issues in the cultural history of the United States from 1860 to the present. Topics to be analyzed include the growth of advertising and consumerism, technological change and its meaning, the rise of sports, suburban life from the 1950s onward, 1960s "counter culture," and neo-conservatism. Emphasizes the interaction of a wide range of cultural forms, including popular literature and music, film, television, and the mail order catalog.

HST 1553 The Family in American History (Group C) 4 QH
Explores the history of the family, including the African-American family, in pre-modern and modern American society. Focuses on the traditional and modern roles of parents and children. Investigates patterns of sexuality, marriage, childrearing, work, play, death, and dying. Compares various family types, including elites, middle class, and indigent. Evaluates external forces affecting family structure and life, such as geographical mobility, industrialization, and warfare.

HST 1554 Women in America (Group C) 4 QH
Offers an analysis of women's economic and social roles from the colonial period to the present, with special attention to women's work, their roles in family and community, and nineteenth- and twentieth-century women's rights movements. (III)

HST 1555 American Elites (Group C) 4 QH
Examines the life of elite individuals and groups in American society, especially in the nineteenth and twentieth centuries.

HST 1556 History of the American Home (Group C) 4 QH
Studies the American home from 1600 to the present. Extensively uses visual materials to develop an above-ground "archeology" of the American home to teach students how things—furnishings, buildings, landscape—contain hidden meanings that can reveal the intimate details of the everyday lives of ordinary and extraordinary Americans. Includes analysis of the ways in which the broader political, economic, and social issues of the past were reflected in Americans' physical surroundings.

HST 1563 History of Sport in America (Group C) 4 QH
Provides a history of the major sports and their impact on American life.

HST 1575 History of Media in America (Group C) 4 QH
Focuses on mass communication in American history, with attention to the role of books, newspapers, magazines, films, radio, and television.

HST 1577 America and the Sea (Group C) 4 QH
Studies the history of exploration and discovery of America, the development of fishing, the rise of ocean commerce, and the history of the American Navy.

HST 1578 The Automobile in America (Group C) 4 QH
Focuses on the impact of the automobile on American society in a historical context. Topics include the abandonment of traditional prohibitions of motorized carriages; the use of planning, taxes, and highway policies to foster the use of the automobile; the effect of the car on land use, recreation, and the economy; and contemporary issues such as pollution and energy.

HST 1581 The Gilded Age and the Progressive Era, 1877–1920 4 QH
Examines the transformation of American society and its economy and analyzes how government responded to these sweeping changes from the 1870s through World War I.

HST 1582 The Growth of American Government Since 1935 (Group C) 4 QH
Examines the expansion of government from Roosevelt to the present, focusing on the reasons for the growth and its consequences, the development of major public policies, and the transformation of the federal role and politics.

HST 1586 American Military History (Group C) 4 QH
Surveys the complex relationship between American society and war, from the age of muskets to the neutron bomb.

HST 1591 American Images of China (Group C or D) 4 QH
Examines the relationship between Sino-American international relations and changes in American popular perceptions of China as revealed in the media and literature. Focuses on Sino-American relations since the nineteenth century, including the period of the missionaries and opium traders; the era of special privileges; the Open Door policy; the first half of the twentieth century, when China became America's favorite protégé; and the years of strain, warfare, and finally accommodation after the Chinese communists came to power in 1949.

HST 1592 History of the Vietnam War (Group C or D)**4 QH**

Presents a history of military conflict in Vietnam with attention to the rise of the Viet Minh during World War II, the struggle against the French in the first Indochina war, the impact of the Cold War, and the involvement of the United States after 1950 in Laos and Cambodia as well as Vietnam. Emphasizes the roles of communism and nationalism in Indochina and the motives for American intervention. Films revealing American reaction to the escalating conflict will be shown.

HST 1604 Latin America: The Modern Period (Group D)**4 QH**

Traces the developments in this region since independence and the inception of nationhood. Topics include: state formation and society in the nineteenth century; economic development and underdevelopment in the region; race, class, and ideology; United States/Latin American relations; populism; the roots of revolution and authoritarianism; and the contemporary experiments with neo-liberal policies.

HST 1605 Introduction to Caribbean History (Group D)**4 QH**

Focuses on the social, economic, and cultural forces that have shaped the character of the Caribbean people. Examines the variety of societies, cultures, and institutions of the region in their historical and contemporary settings, beginning with pre-Colombian cultures, moving through the colonial period, plantation agriculture, slavery, the expansion of U.S. influence, urbanization, economic development models, authoritarian politics, and the contemporary migration of Caribbean people to the United States and Europe.

HST 1610 Topics in Asian History (Group D)**4 QH**

Covers special topics in the history of Asia.

HST 1612 The Modern Middle East (Group D)**4 QH**

Focuses on the Middle East since 1800, with emphasis on the background of present problems. (VI)

HST 1613 The Contemporary Middle East (Group D)**4 QH**

Focuses on political, economic, and social developments in the Middle East since World War II.

HST 1614 The Middle East Today in Fact, Fiction, and Film (Group D)**4 QH**

Presents a study of social, economic, and political changes and conflict in the lives of ordinary people who have been experiencing the recent crises reported in the media. Focuses on common experiences among various peoples—Turks, Armenians, Israelis, Arabs, and Iranians—and emphasizes significant themes: lifestyles, generational conflict, the changing role of women, ethnic or ideological conflict, and the prevalence of identity crises attending cultural and social disruption.

HST 1620/AFR 1191 Early African Civilization (Group D)**4 QH**

Studies the ancient empires of Africa, especially Chana, Songhai, Mali, Zimbabwe, the city-states of East Africa, and the Congo Kingdom. Includes Ethiopian and Egyptian history and controversies to 1800.

HST 1621/AFR 1197 Modern African Civilization (Group D)**4 QH**

Provides an introduction to modern Africa in the years from 1800 to 1960, showing how a new African civilization arose out of the conflict-ridden conditions imposed on the old. Themes include economic, social, political, religious, and artistic life, as well as the influences of slavery, colonialism, and nationalism. (IV)

HST 1623/AFR 1403 West African History (Group D)**4 QH**

Surveys the politics and economics of West Africa from the rise of the Mali Empire to the contemporary problems of national development for the countries from Senegal to Nigeria.

HST 1625/AFR 1405 South African History (Group D)**4 QH**

Presents the historical background to current conflict in the Republic of South Africa and in adjoining Mozambique, Zimbabwe, and Namibia. Examines the rise of the apartheid system—and the opposition and alternatives to it—through the themes of racial conflict, nationalism, and industrialization in this African setting.

HST 1633 Modern China (Group D)**4 QH**

Explores the far-reaching political, economic, and social changes in China from 1800 to the present. Examines the decline of the empire, the impact of the West, the rise of nationalism, industrialization, the changing role of women, the origins of rural revolution, and establishing the Communist state.

HST 1634 Contemporary China (Group D)**4 QH**

Examines Chinese polity, society, and economy from 1949 to the present, including the restructuring of urban and rural society in the 1950s, the rise of a new class, the emergence of factionalism, the Cultural Revolution, and the impact of the post-Mao economic and political reforms.

HST 1637 The Making of Modern Japan: From Samurai to Sony (Group D)**4 QH**

Surveys the evolution of Japan from a third-world nation to a superpower. Major themes include the breakdown of feudalism, the impact of the West, the Meiji Restoration, industrialization, militarism, and Japan's post-World War II modern economic miracle.

HST 1652 Islam Resurgent (Group D)**4 QH**

Analyzes what has been called "the militant revival of Islam" as a rallying point for reformist or revolutionary movements in the Muslim world. Includes little-known Muslim areas outside the Middle East in Africa and Asia. (VI)

HST 1701 Western Civilization 1 (Honors)**4 QH**

Honors equivalent of HST 1101.

HST 1702 Western Civilization 2 (Honors)**4 QH**

Honors equivalent of HST 1102.

HST 1711 America to 1877 (Honors)**4 QH**

Honors equivalent of HST 1201.

HST 1712 America since 1877 (Honors)**4 QH**

Honors equivalent of HST 1202.

HST 1790 Population in European History (Group A or B) (Honors)**4 QH**

Honors equivalent of HST 1390.

HST 1801 Directed Study**4 QH****HST 1805 Approaches to History****4 QH**

Requires students to undertake a major historical project based on the application of appropriate methodologies and upon the substantive understanding of a single subject chosen by the course instructor and announced in advance of the quarter. The course is rotated among the department's faculty. Required for all history majors but open to all upperclass students. *Prereq.* 80 quarter hours of work.

HST 1811, HST 1812, HST 1813, HST 1814**4 QH each****Junior/Senior Honors Program**

For details contact the honors office.

HST 1821 Fieldwork in History I**4 QH**

Offers directed work in historical societies, archives, museums, and other historical agencies. Students should consult the department for details. *Prereq.* HST 1101, HST 1102, HST 1201, HST 1202, and 16 QH in other history courses.

Human Services**HS 1240/SOC 1240 Sociology of Human Service Organizations****4 QH**

Introduces selected theoretical perspectives on human service organizations, emphasizing defining organizational goals and effectiveness. Gives students the opportunity to become familiar with the nature of human service organizations; to compare these organizations to business and industrial organizations; to outline specific problems that human service organizations face; and to propose potential solutions.

HS 1302/ED 1302 The Human Services Professions**4 QH**

Explores what a human service agency is, how it comes into being, and how it grows and changes. Analyzes attitudes, values, skills, and knowledge of the human services worker and the reasons why people in modern society require human services assistance. Views human services from the eyes of clients as well as society as a whole. Requires fieldwork in a human service agency as well as a good deal of independent study. Required for all human services majors; open to other students on space-available basis. *Prereq.* ED 1100, SOC 1100, or equivalent.

HS 1309/ED 1309 Intervention Strategies for the Human Services**4 QH**

Introduces the range of skills used in working with clients in the various helping professions such as counseling (individual and group), advocacy, rehabilitation, community organizing, and income maintenance. Utilizes role playing, simulations, and interviews with practicing professionals. Requires reading but not fieldwork. Intended as preparation for more specialized courses; required for human services majors but open to other students with appropriate backgrounds.

HS 1324/SOC 1324 Human Services Research and Evaluation**4 QH**

Covers basic issues in applied research and the evaluation of services, including the purposes of evaluation, ethic formulating questions and measuring answers, designing evaluations and planning oriented research, utilizing evaluation results, and the turbulent setting of action programs. Suitable for students majoring in human services, sociology, psychology, nursing, health education, and related fields. *Prereq.* SOC 1320 or other statistics, SOC 1240, or permission of instructor.

HS 1333 Senior Seminar in Human Services**4 QH**

Designed for seniors in human services. Examines emerging roles and career options within the human services field. Study will focus on self-examination of attitudes and values affecting delivery of services, exploration of ethical issues and dilemmas relevant to human services, grantsmanship and funding issues, staff supervision and development within human services agencies, and refinement of group leadership skills.

HS 1336, HS 1337 Field Internship in Human Services 1 and 2**6 QH each**

Human services students are required to fulfill two internship placements during the last two years of their program. Each

placement consists of 150 hours on-site and generally varies according to the students' interests. Examples of placement sites include community centers, nursing homes, vocational workshops, state and federal agencies for children, and recreational facilities. Experiences are supervised by University staff to maximize the students' learning opportunities. *Prereq.* Junior or senior standing and approval by the Human Services Internship coordinator by early in quarter previous to planned quarter of internship.

Interdisciplinary Courses**INT 1121/LNS 1121/SOA 1121****4 QH****Introduction to Latino, Latin American, and Caribbean Studies**

Offers an interdisciplinary introduction to Latinos and people of Latin American and Caribbean origin in the United States as well as to the regions of Latin America and the Caribbean. Dispels a series of powerful myths associated with U.S. Latinos and in Latin American and Caribbean society, such as racial inferiority, poverty, machismo, and violence. Introduces the construction of Latino, Latin American, and Caribbean identities as well as the politics, economics, history, and culture.

INT 1150/SOC 1150**4 QH****Introduction to Women's Studies: Image, Myth, and Reality**

Surveys the issues and methodologies involved in the interdisciplinary study of women. Examines the political, economic, social, and historical processes that have created both the image and the reality of women in societies. Guest lecturers provide an overview of the diverse disciplinary approaches to the study of women. (II)

INT 1201 An Analysis of American Racism**4 QH**

Discusses the cycle by which racism in our institutions helps form our attitudes and the manner in which our attitudes, in turn, shape our institutions. Emphasizes the practical, day-to-day aspects of racism, rather than the theoretical and historical.

INT 1215 Into the Ocean World**4 QH**

Focuses on the seas' complexity and the far-reaching consequences of our interactions with them. A comprehensive interdisciplinary introduction to the oceans. Draws on specialists in the sciences, social sciences, humanities, and arts, each with an interest in marine issues and a commitment to bridging the gaps among disciplines. The course themes are as broad as the oceans, but, when appropriate, we focus on Boston Harbor, a first step into the ocean world for those of us in this area. *Prereq.* Permission of instructor.

INT 1216 A History of Seafaring**4 QH**

Surveys maritime transportation, trade, travel, exploration, and warfare from approximately 3500 B.C. to the end of the wooden boat era in the late nineteenth century. Prior to the widespread application of steam power on land and sea in the nineteenth century, ships were the fastest, safest, and most economical means of transporting large cargoes over long distances. Literary and art history sources are also introduced, along with several films on maritime archaeology. *Prereq.* Permission of instructor.

INT 1217 Water: Planning for the Future**4 QH**

Explores the ways in which water has affected our bodies, our planet, our history, and our culture, and the danger posed by increasing demand, waste, and pollution on our limited supply of usable fresh water. Considers water through scientific, historical, and cultural viewpoints, and surveys contemporary water problems

in all their dimensions—political, economic, and technological. Same as SOC 1150. *Prereq.* *Permission of instructor.* (VI)

INT 1219 Advanced Seminar in Marine Studies 4 QH

Focuses on outstanding issues in the marine environment. Using a seminar format, students from colleges and universities throughout the Boston area convene to address the complex interactions of disciplines, including scientific, legal, economic, and technical aspects of issues, that come into play in marine affairs. Seminars are lead by experts actively involved in the issues.

INT 1220 Coastal Issues Seminar 4 QH

Focuses on outstanding issues in coastal environmental affairs. Discusses scientific, legal, economic, and technical aspects of coastal issues, and integrates them into problem-solving exercises. *Prereq.* *Permission of instructor.*

INT 1302 Female Perspectives on Society 4 QH

Examines social science and interdisciplinary feminist literature that focuses on women in families and at work, and that analyzes issues affecting women's health and safety, including violence against women and abortion. Incorporates the perspectives of women of color. Considers and evaluates women's views of social life as well as recognizes the difference among women. (VI)

INT 1320 Exploring the Humanities Through Film 4 QH

Investigates the ways in which the methods of the humanities can expand one's awareness of the sources, statements, and meanings of popular films. Presents series of movies for evaluation in the light of readings, the various approaches presented by faculty members from a number of humanistic disciplines, and students' own experience. (II)

INT 1321 Modernism: Art, Film, and Literature 4 QH

Examines the interrelation of film, art, and literature in the major movements of the twentieth century to 1939. Studies Futurism, Cubism, Expressionism, Dada, and Surrealism, featuring European films, art, and literature in a comparatist perspective. Examines the persistence of modernist elements in contemporary art, literature, and film. Research paper or creative project due at the end of the term. Team-taught by members of the art, English, and modern languages departments.

INT 1570 On Understanding Science 4 QH

Develops the quantitative and qualitative skills needed to critically read about science in newspapers and magazines. Examines the historical, philosophical, and social nature of science; units and scientific notation; technological developments of the last two hundred years; sources of information; and current scientific developments.

INT 1580 Physical Chemistry with Biological Applications 4 QH

Examines physiochemical principles as they apply to biological processes. Topics include chemical equilibria, reaction kinetics, basic thermodynamics, oxidation-reduction reactions and bioenergetics, and transport. Emphasizes problem solving as a tool for learning, using a quantitative approach. Explains basic assumptions and limitations underlying principles; for the most part, however, rigorous derivations are avoided. Makes applications to basic experimental techniques in biochemistry by way of relevant biochemical examples. *Prereq.* *BIO 1261.*

INT 1700 War and Conflict in the Nuclear Age (Honors) 4 QH

Honors equivalent of INT 1140. Discusses the development of nuclear weapons. Explores the decisions leading to and the aftermath of the nuclear attack on Hiroshima and Nagasaki. Examines the Cold War and the growth of nuclear arsenals, the potential causes of a nuclear war and the probable effects, and this issue's moral questions. Evaluates strategies for preventing nuclear war. (VI)

INT 1702 War Work: The Experience of World War II (Honors) 4 QH

Examines the Second World War as an example of the impact external events can have on professions. This upperclass course is team-taught by faculty from various disciplines.

INT 1704 Northeastern in the 1960s (Honors) 4 QH

Explores how college life and curricula have changed over the past twenty years by studying the microcosm of Northeastern University. Involves research papers on topics such as curriculum changes, student values as reflected in literature and folklore, and the Northeastern riots in comparative context.

INT 1705 Greek Language and Literature (Honors) 4 QH

Focuses on Attic Greek grammar and selections from Greek literature in the original language. Discussion of texts is major part of course.

INT 1706 Industrial Relations (Honors) 4 QH

Presents theories and applications of labor management relations through lectures and case discussions. Focuses on the development of American and European labor movements, emphasizing legal and economic factors. Topics include union objectives, organization, and structure; union government and democracy; collective bargaining; and management approaches to industrial relations.

INT 1707/ENG 1550 Psychology and Literature (Honors) 4 QH

Examines literature from a psychoanalytic perspective. Topics include Freud's theories, object relations, Lacan's theories, and Kohut's self-psychology. Discusses works by Charles Dickens, Franz Kafka, Virginia Woolf, Doris Lessing, and Anne Tyler.

INT 1709 Cultural Passages in the Arts—Boston 4 QH

Exposes students to the richness of the Boston cultural environment through a directed field study with various Northeastern University faculty. Students will be required to keep a detailed journal and produce a final creative project. Field trips will include various museums, theaters, and some neighborhoods within the city of Boston.

INT 1710 Italy (Honors) 4 QH

Honors interdisciplinary seminar on the history, art and modern culture of Italy with a primary focus on Pisa and Florence.

INT 1721 Modernism: Art, Film, and Literature (Honors) 4 QH

Honors equivalent of INT 1321.

International Affairs

IAF 1100 Introduction to International Affairs 4 QH

Introduces the study of international affairs through lectures, guest lectures, discussions, case studies, films, and readings across disciplines. Provides students with a basis for understanding the global village. Covers a range of issues including politics, economics, history, society and culture, and the environment.

- IAF 1104/SOA 1104 Cultures of the World** 4 QH
Explores cultural differences among peoples in societies around the globe and analyzes how diverse cultural patterns can be studied and described. (II)
- IAF 1112/POL 1112 Introduction to International Relations** 4 QH
Applies basic theories of international relations to examining the foreign policies of the key actors in the international system. Covers topics of international aid, trade, and monetary affairs; issues relating to the arms race, nuclear proliferation, arms control, and disarmament; international law and organizations, human rights, and the impact of technology on the functioning of the international system. (II)
- IAF 1113/POL 1113 Introduction to Foreign Governments** 4 QH
Presents a comparative study of political organization and behavior in selected countries. Includes such topics as political economy, leadership, political institutions, political culture, and political participation.
- IAF 1122/HST 1122 World Civilization Since 1648** 4 QH
Examines the world from 1648 to the present. Emphasizes the intellectual, technological, and political expansion of Europe and the reactions of the rest of the world. Covers such topics as the global development of modern dynastic and bureaucratic states; the expansion of the European economy with its attendant trade wars; imperial expansion and the explosion of the slave trade; the development and reaction of the American Indian, Asian, and African civilizations to that imperialism; the sporadic extension and eclipse of colonialism; and the growing tensions between traditional patterns of loyalty and authority and national, regional, and even global systems and cultures as we approach the twenty-first century. (IV)
- IAF 1300 International Conflict and Negotiation** 4 QH
Introduces students to the dynamics of conflict in the international arena: how conflicts evolve, fester, and are managed and resolved. Covers different types of regional and international conflicts, focusing on historical, economic, social, and political aspects of a variety of conflicts and the consequences they hold for regional and international actors.
- IAF 1330/ECN 1330 Development Economics** 4 QH
Explores prospects for economic growth and development in poor nations as indicated by economic analysis and historical experience; social, cultural, and institutional determinants of growth; analysis of agriculture and development; the role of technological change; population; and foreign trade. (V)
- IAF 1400 International Experience Workshop** 4 QH
Provides an opportunity for students who have completed their International Experience requirement for the major or minor in international affairs to participate in a workshop coordinated by a faculty member of the program. Students will prepare materials for the class relating to the political, social, economic, historical, and cultural aspects of the countries where they have studied, worked, or interned. (This course is open to other students who have comparable international experience.)
- IAF 1870 Senior Seminar in International Affairs** 4 QH
Develops one or two main topics to be decided by the instructor in consultation with faculty and students in the International Affairs program. Topics, which will vary from year to year, may include, for example, emerging economies, world trade, arms control, and global stability.

Journalism

- JRN 1103 Newswriting 1** 4 QH
Covers functions of the editorial department and procedures in obtaining and writing news stories. Offers extensive news writing and an introduction to interviewing. Legal issues defined. Typing skills required. *Prereq.* ENG 1275 with grade of C or better.
- JRN 1104 Newswriting 2** 4 QH
Offers practice in multi-source and breaking stories. Provides an introduction to government and court reporting, advanced work in interviewing, and experience in writing under deadline pressure. Discusses legal issues. *Prereq.* JRN 1103 with grade of C or better.
- JRN 1105 Computer-Assisted Reporting** 4 QH
Introduces novices to the computing skills needed by today's journalists, yet holds sufficient challenges for those who have already found their way onto the World Wide Web. Presents material in two sections. Part one, Using the Internet, contains parallel study of using the Internet to enhance news stories published in familiar formats such as newspaper, magazine, radio, and television, and using the Internet to publish material. Part two, Database Computer Skills for Journalists, focuses on the many sources of information available via computer that can be reconfigured to help reporters research and write a news story.
- JRN 1206 Editing** 4 QH
Provides practice in copy editing and headline writing. Presents assignments in photo selection, cropping, and culine writing. Introduces page layout. *Prereq.* JRN 1104 with grade of C or better.
- JRN 1250 Interpreting the Day's News** 4 QH
Considers the news of the day and the function of the newspaper, news magazine, and news broadcasts in American life. Topics include rights and responsibilities of the press and how news is gathered, processed, and disseminated by the various media. (VI) For nonmajors as well as majors.
- JRN 1301 Basic Photojournalism** 4 QH
Covers camera and darkroom procedures along with cropping, assignment techniques, theory, and photo caption methods. *Prereq.* JRN 1104.
- JRN 1305 Techniques of Journalism** 4 QH
Provides practice in writing in-depth and multiplesource stories requiring significant research. Provides an introduction to investigative reporting, practice in feature writing, and a review of legal issues. *Prereq.* JRN 1104.
- JRN 1320 Radio News Gathering and Reporting** 4 QH
Covers writing and editing news for radio, with practice in interviewing, organizing news scripts, and integrating audio materials into broadcast. *Prereq.* JRN 1103.
- JRN 1336 Public Relations Principles** 4 QH
Presents the principles, history, and methods of public relations, processes of influencing public opinion, responsibilities of the public relations practitioner, and analyses of public relations programs. *Prereq.* Sophomore standing.
- JRN 1350 Advertising Principles** 4 QH
Covers the development, procedures, economic functions, and responsibilities of advertising: planning, research, production, and other elements that go into successful advertising. *Prereq.* Upperclass standing.

- JRN 1421 Television Newswriting** 4 QH
Covers writing for TV news as opposed to other news media, importance of the writer-reporter as field-producer and writer-producer, and terms and language used in the production of TV news shows. Includes actual individual production of news shows, field trips to TV stations, and guest lecturers from the TV news media. *Prereq.* JRN 1103.
- JRN 1422 Television News Production** 4 QH
Demonstrates techniques used by the electronic journalist and TV news producer. Provides the opportunity to build a TV news show and to do reporting with portable TV cameras and editing equipment. *Prereq.* JRN 1103 and JRN 1421.
- JRN 1428 The Role of Journalism in Sports** 4 QH
Offers an analysis of the impact of journalism on the institution of sports in this country and around the world. Considers sports reporting as a motivator and demotivator from Little League to college and professional levels. Looks at the effect of news media coverage on violence in organized sports, on America's physical fitness, and on other aspects of society.
- JRN 1430 Fundamentals of Sports Reporting** 4 QH
Applies principles of news reporting to covering men's and women's sports for print and broadcast media. Emphasizes using sports reference materials, developing contacts, interviewing, and structuring the sports story. Also discusses investigative reporting in sports. *Prereq.* JRN 1104.
- JRN 1432 Local Government Reporting** 4 QH
Discusses coverage of town/city government, with emphasis on the "beat" approach to reporting public affairs. Focuses on practical, in-the-field experience with town meetings, meetings of boards of selectmen, and other commissions and bodies transacting public business. *Prereq.* JRN 1104.
- JRN 1440 Design and Graphics** 4 QH
Applies layout and design principles to newspapers, magazines and other print media. Covers type faces, copy measuring, dummyming, photo sizing, and keeping copy flow charts. Applies design and graphics principles to advertising layout. *Prereq.* JRN 1206.
- JRN 1451 Advertising Copy Writing** 4 QH
Covers theory and techniques of creating advertising copy for newspapers, magazines, radio, television, and direct mail. Emphasizes fact gathering, copy structure, and advertising design. *Prereq.* JRN 1103, and JRN 1350.
- JRN 1460 Public Relations Problems** 4 QH
Applies public relations techniques to actual problems; presents case studies in industry, labor, education, government, social welfare, and trade associations. *Prereq.* JRN 1336.
- JRN 1501 History of Journalism** 4 QH
Traces the development of American journalism from its European and English beginnings. Topics include the colonial press, the great personal journalists of the nineteenth century, and the impact of major technological changes in mass communications media in the twentieth century. Some writing required. *Prereq.* Upperclass standing.
- JRN 1508 Law of the Press** 4 QH
Examines legal problems of libel, invasion of privacy, and access to government information; discusses the balance between private rights and the public's "need to know." *Prereq.* Upperclass standing.
- JRN 1512 Journalism Ethics and Issues** 4 QH
Explores the responsibilities of news media and ethical issues confronting decision-makers in journalism. Examines the principles found in codes of the American Society of Newspaper Editors, the Associated Press Managing Editors, the Society of Professional Journalists, and other organizations. Some writing required.
- JRN 1522 Magazine Writing** 4 QH
Covers writing and free-lancing magazine articles; analyzing magazines as markets; and selecting the best feature format—how-to-do-it, profile, personal experience, human interest, interpretive pieces, and others. *Prereq.* JRN 1104.
- JRN 1540 Sports Public Relations** 4 QH
Covers the planning and implementing of public relations functions for professional, amateur, and recreational athletic organizations. Stresses use of journalistic research techniques, implementation of programs, and effective communication with news media and various publics. *Prereq.* JRN 1103, and JRN 1336.
- JRN 1552 Advertising Practice** 4 QH
Covers the preparation of advertising for print and broadcast media, including campaign planning and space and time buying and scheduling. Includes product research, consumer surveys, and measuring the effects of advertising. *Prereq.* JRN 1451.
- JRN 1561 Public Relations Practice** 4 QH
Demonstrates practices and techniques employed in the field, including organization of events and functions. Studies campaign planning, research, and media relationships. *Prereq.* JRN 1103 and JRN 1336.
- JRN 1575 Publication Production and Management** 4 QH
Examines the organizational structure, production methods, and management procedures of print media companies. Analyzes the interaction of business, advertising, production, and circulation departments. *Prereq.* JRN 1206.
- JRN 1617 The Constitution and Mass Communications** 4 QH
Explores the meaning of freedom of the press through study and discussion of the evolving First-Amendment interpretations of the United States Supreme Court. *Prereq.* Upperclass standing.
- JRN 1703 Newswriting 1 (Honors)** 4 QH
Honors equivalent of JRN 1103.
- JRN 1704 Newswriting 2 (Honors)** 4 QH
Honors equivalent of JRN 1104.
- JRN 1870, JRN 1880 Seminar** 4 QH
Offers discussions and readings on topics of current significance in various journalistic fields. *Prereq.* Upperclass standing.
- JRN 1890, JRN 1891 Directed Study in Journalism** 4 QH each
Prereq. Permission of instructor.
- JRN 1892 Topics** 4 QH
Prereq. Permission of instructor.
- JRN 1894, JRN 1895, JRN 1896, JRN 1897 Junior/Senior Honors Project** 4 QH each
For details contact the honors office.

Linguistics

LIN 1118/ENG 1118 Introduction to Language and Linguistics 1

4 QH

Introduces students to their unconscious linguistic knowledge about sentence structure (syntax), meaning (semantics), word forms (morphology), and speech sounds (phonology). Examines other issues related to language such as the Black English/Standard English debate, women's and men's language, "talking" chimpanzees, "talking" computers, and the nature/nurture controversy. (II)

LIN 1119/ENG 1119 History of the English Language

4 QH

Studies the development of modern English from Anglo-Saxon beginnings; effects of Scandinavian and Norman invasions; dialect geography; evolutionary changes, word formation, and borrowing; and origins of writing and problems of spelling. Readings include both formal and informal writings, literary selections, wills/journals, and private and public letters. (III)

LIN 1215/PHL 1215 Symbolic Logic

4 QH

Focuses on the syntax and semantics of propositional logic and first order quantification theory. Considers relations between these systems and natural language. Covers analysis of the notion of derivation within a system, the notion of logical consequence, and practice in analyzing logical structure in natural language sentences. (II)

LIN 1218/ENG 1218 Introduction to Language and Linguistics 2

4 QH

A workshop that focuses on three core areas in the study of language: syntax, morphology and phonology. Examines the regularities that underlie the linguistics system inside each language user's mind, with a slant toward "doing" linguistics: working with data, analyzing it, and ultimately explaining it. *Prereq.* LIN 1118/ENG 1118 or permission of instructor.

LIN 1220/LNL 1220 Introduction to Phonetics and Phonology

4 QH

Explores the acoustic and articulatory basis of phonology. Emphasizes hands-on experience with standard areas in modern phonology, including phonetics, phonetic variation, natural classes of sounds, phoneme alternations, rule systems, and prosodic phonology. Introduces major contemporary theories including autosegmental phonology and feature geometry.

LIN 1231/AFR 1231 African-American English

4 QH

Addresses topics in the study of African-American English. Investigates the hypotheses about the origins of African-American English as well as arguments about the relation of the dialect to English and other languages. Considers issues regarding the use of the dialect in the educational context.

LIN 1235/LNL 1235 Applied Linguistics

4 QH

Explores the solution of language-based real-world problems. Solutions to these problems depend on information not only from linguistics but also from a variety of other disciplines such as anthropology, sociology, education, ethnic and area studies (including literature), and public administration. Studies the relationship of linguistics to applied linguistics; second language acquisition; second and foreign language teaching; language policy and planning; and the linguistic aspects of multiculturalism.

LIN 1240/LNL 1240 Bilingualism

4 QH

Focuses on the fact that half of the world's population is bilingual, that is, uses two or more languages on a regular basis. Also explores the fact that bilingualism remains a poorly understood phenomenon surrounded by a number of myths: those that hold

that bilinguals are found in bilingual countries and are equally fluent in their languages; that bilingual children suffer from cognitive impoverishment; and that bilingual education hinders the assimilation of minority groups. Reviews all aspects of bilingualism (in the world, in society, in the child, and in the adult). Discusses topics such as biculturalism and language change.

LIN 1245/LNF 1250 History of the French Language

4 QH

Examines the development and emergence of the French language from its earliest literary manifestations. Offers the opportunity to become familiar with the language's earlier stages. Emphasizes developing a working knowledge of medieval French. Includes the relationship of Old French to Latin, structural characteristics of Old French, and the impact of historical events on language. Compares different stages of French. Conducted in English. *Prereq.* Reading knowledge of French or permission of instructor.

LIN 1250/ASL 1250 Linguistics of American Sign Language

4 QH

Introduces the basic issues of linguistics by examining the structural properties of American Sign Language and comparing it with other languages having similar properties. Includes phonology (formational properties of signs), morphology (word formation rules, derivation and inflection, complex verbs, classifiers, verb modulations), semantics (the meaning structure of signs), and syntax (the structure of ASL utterances in terms of old versus new information and the structure of ASL narratives). *Prereq.* ENG 1118 and the ability to follow lectures in ASL.

LIN 1255/LNS 1250 History of the Spanish Language

4 QH

Examines the development and emergence of the Spanish language. Offers the opportunity to become familiar with the language's earlier stages. Emphasizes developing a working knowledge of medieval Spanish. Includes the relationship of Old Spanish to Latin, structural characteristics of Old Spanish, and the impact of historical events on language. Compares different stages of Spanish. Conducted in English; however, the textbook is in Spanish. *Prereq.* Reading knowledge of Spanish or permission of instructor.

LIN 1260/LNL 1260 Introduction to Romance Linguistics

4 QH

Provides a general linguistic introduction to one of the most important language families. Discusses the structural characteristics of several Romance languages. Includes defining a language family, how and why languages change, and the relationship of standard and nonstandard linguistic varieties. Studies contemporary theoretical issues in Romance linguistics including object pronoun placement, word order, creolization, and subject pronoun use. Conducted in English. *Prereq.* Reading knowledge of one Romance language or permission of instructor.

LIN 1262/PSY 1262 Psychology of Language

4 QH

Provides a basic introduction to psycholinguistics. Topics include the nature and structure of languages, processes involved in the production and comprehension of language, the biological bases of language, and aspects of language acquisition. Examines current theories of language processing and related experimental findings. *Prereq.* PSY 1112 or PSY 1113.

LIN 1263/PSY 1263 Nonverbal Communication

4 QH

Examines the messages we send by posture, facial expression, gesture, gait, and interpersonal distance. Also explores how power, status, and gender affect nonverbal communication. *Prereq.* PSY 1112 or PSY 1113.

LIN 1335/SOA 1335 Language and Culture**4 QH**

Focuses on the anthropological study of linguistics. Presents basic theories of sociolinguistics and explores language in its social context. Includes animal communication; language learning; language and mind; cognitive and symbolic anthropology; the ethnography of speaking, speech, and boundaries; multilingualism; language and gender; language and ethnicity; language and social class; and pidgins and creoles. Includes several field assignments.

LIN 1362/PSY 1362 Child Language**4 QH**

Examines how language develops in children. *Prereq.* LIN 1118, PSY 1262 or permission of instructor.

LIN 1364/PSY 1364 Cognition**4 QH**

Provides a basic introduction to human cognition. Topics include pattern recognition, attention, memory, categorization and concept formation, problem solving, and aspects of cognitive development. Examines current theories of cognitive processing and related experimental findings. *Prereq.* PSY 1112 or PSY 1113.

LIN 1365/PSY 1365 Language and the Brain**4 QH**

Focuses on linguistic behavior from a neuro-psychological viewpoint. Examines models of how the nervous system, the brain in particular, controls the production, perception, and internal manipulation of language. Considers localization of cerebral functions and hemispheric lateralization; experimental and clinical evidence for functional models; aphasia and other language pathologies; schizophrenic language; evidence from "slips of the tongue"; and the bilingual brain. Compares speech, sign language, and writing systems. Also discusses interpretation and translation. *Prereq.* PSY 1262 or permission of instructor.

LIN 1401/ENG 1401 Introduction to Syntax**4 QH**

Offers an introduction to the mental rules that speakers of any language unconsciously follow when they combine words into meaningful sentences and when they decode the strings of sounds that they hear every day. Examines sentence structure, syntactic principles, universal grammar, and innateness in a Chomskyan generative framework. (V)

LIN 1407/ENG 1407 Introduction to Semantics**4 QH**

Focuses on meaning and how it is expressed in language through words, sentence structure, intonation, stress patterns, and speech acts. How do content, logic, and speakers' and listeners' assumptions affect what sentences can mean? In what way is linguistic meaning determined by our perceptual system or our culture?

LIN 1408/ENG 1408 Topics in Linguistics**4 QH**

Examines closely one of a range of topics from the perspective of current linguistics: American dialects, language and law, women's and men's language, words and word structures, or issues in linguistics and literature.

LIN 1415/AFR 1415 African Language**4 QH**

Seeks to prepare students for serious theoretical and practical study of the West African language and literature known as Kwa, the largest language subgroup in the Niger-Congo family. Students will explore the classification of African languages, the application of basic linguistics, and the history of these languages in Africa and the Western hemisphere, all leading to an introduction to spoken Yoruba and Igbo.

LIN 1440/PHL 1440 Philosophy of Language**4 QH**

Examines prospects for a theory of language, its syntax, and its semantics. Examines contrasts between theory of reference and

theory of meaning. Asks whether there are universals of language. Analyzes relations between linguistics and psychology. Includes readings from Frege, Quoin, Russell, Chomsky, and Fodor. *Prereq.* Permission of instructor.

LIN 1562/PSY 1562 Psycholinguistics Laboratory**4 QH**

Provides students the opportunity to acquire first-hand experience in conducting research on issues in the psychology of language. Focuses on classical experiments and their implications for broader issues of language processing. Involves students in all aspects of each experiment, including collecting and analyzing data and preparing lab reports. *Prereq.* PSY 1212 and PSY 1261 or PSY 1364.

LIN 1564/PSY 1564 Cognition Laboratory**4 QH**

Provides students the opportunity to acquire first-hand experience in conducting research on issues in human cognition. Focuses on classical experiments and their implications for broader issues of cognitive functioning. Involves students in all aspects of each experiment, including collecting and analyzing data and preparing lab reports. *Prereq.* PSY 1212 and PSY 1354 or PSY 1262.

LIN 1661/PSY 1661 Seminar in Psycholinguistics**4 QH**

Offers intensive study and discussion of issues in the psychology of language. Specific topics vary by quarter. *Prereq.* PSY 1212 and PSY 1262 or PSY 1364.

LIN 1662/PSY 1662 Seminar in Cognition**4 QH**

Offers intensive study and discussion of issues in cognitive psychology. Specific topics vary by quarter. *Prereq.* PSY 1212 and PSY 1262 or PSY 1364.

LIN 1692 Seminar in Linguistics**4 QH**

Specific topics vary by quarter.

LIN 1693 Seminar in Linguistics**4 QH**

Specific topics vary by quarter.

LIN 1801 Directed Study**1 QH**

Offers independent work on a chosen topic under the direction of a faculty member. *Prereq.* Permission of instructor.

LIN 1802 Directed Study**2 QH**

Offers independent work on a chosen topic under the direction of a faculty member. *Prereq.* Permission of instructor.

LIN 1803 Directed Study**3 QH**

Offers independent work on a chosen topic under the direction of a faculty member. *Prereq.* Permission of instructor.

LIN 1804 Directed Study**4 QH**

Offers independent work on a chosen topic under the direction of a faculty member. *Prereq.* Permission of instructor.

Mathematics

MTH 1000 Mathematics Preliminaries I**4 QH**

Supplies, together with MTH 1010, the high school math background necessary for a student to enroll in MTH 1101, MTH 1106, or MTH 1113. Includes the arithmetic of signed numbers, fractions, decimals, and percents; operations on polynomials; solving simple first degree equations; and laws of exponents. *Prereq.* Permission of course coordinator.

MTH 1010 Mathematics Preliminaries 2**4 QH**

Supplies, together with MTH 1000, the high school math background necessary for a student to enroll in MTH 1101, MTH 1106, or MTH 1113. Includes solving first and second degree equations and systems of equations; graphic lines and parabolas; solving equations with algebraic fractions; solving word problem applications. *Prereq.* Permission of course coordinator.

MTH 1101 Applications of Algebra**4 QH**

Examines linear equations and their graphs, and systems of linear equations and linear inequalities in two variables, with application to linear programming. Introduces matrices with application to Markov chains; set theory, techniques of counting; permutations and combinations and elementary probability. (I)

MTH 1103 Basic Probability**4 QH**

Covers introduction to probability, sample spaces with equiprobable events, permutations and combinations, conditional probability. Also discusses random variables, introduction to Markov processes. (Equiv. to MTH 1150.)

MTH 1106 Functions and Algebra**4 QH**

Examines how to solve various kinds of algebraic equations: linear, quadratic, and linear systems in two and three unknowns. Considers applications to word problems such as motion, mixture, and variational problems. Covers the concept of function, graphs, line slopes, and graphs of polynomials. Also discusses some elementary trigonometry and vectors in the plane. *Students do not receive credit for this course if they have already received credit for MTH 1188 or MTH 1191.*

MTH 1107 Functions and Basic Calculus**4 QH**

Introduces differential calculus. Examines elementary rules of differentiation with application to graph sketching and to maximum and minimum problems. Discusses exponential and logarithmic functions with applications to compound interest, population growth, and radioactive decay. (I) *Prereq.* MTH 1106. *Students do not receive credit for MTH 1107 if they have already received credit for MTH 1114.*

MTH 1108 Basic Calculus 2**4 QH**

Offers a review and continuation of differential calculus, graphing and differentiation of trigonometric functions; also presents an introduction to integral calculus with applications to geometric problems and differential equations. *Prereq.* MTH 1107.

MTH 1113 College Mathematics for Business and Economics**4 QH**

Focuses on sets, rectangular coordinates and graphs, functions and functional notation; linear, exponential, and logarithmic functions. Studies permutations and combination, elementary probability concepts, and simple and compound interest annuities.

MTH 1114 Calculus for Business and Economics**4 QH**

Studies functions, derivatives, differential of polynomials, exponential functions and logarithmic functions; graphics functions using maximum, minimum, inflection points; and optimization in nonlinear problems; marginal analysis of cost, revenue, profit functions. Emphasizes work problems and applications. *Prereq.* MTH 1113 or equivalent. *Students do not receive credit for MTH 1114 if they have already received credit for MTH 1107.*

MTH 1120, MTH 1121 Intensive Calculus 1 and 2**6 QH each**

Assists students in overcoming deficiencies in precalculus mathematics without losing ground in the MTH 1123 sequence.

Reviews high school algebra, introduces trigonometric functions, and covers the material in MTH 1123 and MTH 1124. Includes lecture and homework review sessions. (Students placed in this course by request or on the basis of their College Board scores and the results of an orientation-week diagnostic test.)

MTH 1123 Calculus for Engineering Majors 1**4 QH**

Introduces the differential calculus of one variable, including trigonometric, exponential, and logarithmic functions, together with their graphs. Includes average rates of change, instantaneous rates of change, derivatives, and the chain rule. Covers curve sketching, applications of the derivative to problems involving related rates, and maxima and minima.

MTH 1124 Calculus for Engineering Majors 2**4 QH**

Introduces integral calculus including areas, volumes, and other applications. Studies integration involving trigonometric, inverse trigonometric, exponential, and logarithmic functions. Introduces differential equations. *Prereq.* MTH 1123.

MTH 1125 Calculus for Engineering Majors 3**4 QH**

Studies the calculus of elementary functions in the context of complex numbers. Includes infinite series as well as second order differential equations. *Prereq.* MTH 1124.

MTH 1133 Calculus for Life Sciences 1**4 QH**

Begins with the fundamentals of differential calculus and proceeds to specific problems encountered in biological research. Studies the formulation of physiological problems in terms of differential equations; solutions of differential equations by method of undetermined coefficients; and application to compartmental problems.

MTH 1134 Calculus for Life Sciences 2**4 QH**

Studies integral calculus; trigonometric functions; solutions of differential equations by separation of variables; and advanced compartmental problems. Introduces pharmacokinetics, numerical integration, and Euler's method. *Prereq.* MTH 1133.

MTH 1135 Calculus for Life Sciences 3**4 QH**

Presents functions of several variables, Taylor polynomials, and infinite series. *Prereq.* MTH 1134.

MTH 1137 Discrete Mathematics**4 QH**

Covers binary arithmetic, basic set theory, functions and induction; studies permutations, combinations, Euclidean algorithm and congruence; introduces recurrence relations and logic gates. *Prereq.* MTH 1123.

MTH 1140 Calculus for Science Majors 1**4 QH**

Presents introductory calculus primarily for mathematics, physics, and chemistry majors. Together with MTH 1141 and MTH 1142, includes derivatives and integrals of one-variable functions; applications to curve sketching, maxima and minima problems, area, moments, simple volumes, etc.; approximation methods, including numerical integration, root finding, Taylor series, and power series; introduces differential equations. Requires students to master the use of the computer to make value tables and plot curves and to implement simple numerical algorithms.

MTH 1141 Calculus for Science Majors 2**4 QH**

Continues MTH 1140. *Prereq.* MTH 1140.

MTH 1142 Calculus for Science Majors 3**4 QH**

Continues MTH 1141. *Prereq.* MTH 1141.

MTH 1150 Probability, Statistics, and the Computer**4 QH**

Presents a computer-oriented introduction to statistical methods, with applications in the social and life sciences. Examines descriptive statistics, elementary probability, correlation and regression, and the fundamentals of statistical inference (confidence intervals and hypothesis testing) with a minimum of mathematical derivations. Uses a statistical computer package such as MINITAB or SPSS to solve supplementary problems. (Equivalent to MTH 1103.) *Prereq.* Nonmath majors.

MTH 1152 Statistical Thinking**4 QH**

Introduces the statistical style of thinking for students without mathematical sophistication or who ordinarily don't like mathematics. Assigns readings from a wide variety of sources. Uses extensive class discussion and homework problems to teach students to use statistics and to critically evaluate the use of statistics by others. Covers descriptive statistics, statistical tests, confidence intervals, regression, and sampling. (II) *Economics majors do not receive credit for this course if they have already earned credit for ECN 1250 or MSC 1201.*

MTH 1183 Mainstreams of Mathematics**4 QH**

Traces the development of some key mathematical ideas, their historical context, and current applications. May include mathematical games and puzzles; number systems past and present; logic and computers; calculus and the rise of modern science, art, and symmetry; and cut-and-paste topology. Assumes no more than high school algebra and geometry. Encourages students with diverse backgrounds to rediscover mathematics through individual projects, supplemental readings, and classroom discussions.

MTH 1188 Problem Solving and Pre-Calculus 1**6 QH**

Develops basic algebraic and problem-solving skills in students who indicate these needs and are enrolled in this course rather than the four-credit MTH 1191. Together with MTH 1189, prepares the student for calculus (MTH 1193). Includes writing equations and relating word problems to equations, plotting linear equations, word problems involving algebraic fractions, algebraic operations, radicals, inequalities, functional notation and the graphing of functions. The TI-85 graphics calculator is required for this course. *Students who earn credit for this course may not receive credit for MTH 1106 or MTH 1191.*

MTH 1189 Problem Solving and Pre-Calculus 2**6 QH**

Continues MTH 1188. Includes functions and graphing, composite functions and inverse functions, logarithmic and exponential functions and equations, trigonometric functions and their graphs, solving trigonometric problems, trigonometric identities, and vectors in two-dimensions. The TI-85 graphics calculator is required for this course. (Equivalent to MTH 1192.)

MTH 1191 College Algebra**4 QH**

Focuses on fundamental algebraic operations, complex numbers, radicals and exponents, functions, linear and quadratic equations, irrational equations, inequalities, variation, and roots of polynomial equations. The TI-85 graphics calculator is required for this course. *Prereq.* BSET majors only. *Students who earn credit for this course may not receive credit for MTH 1106 or MTH 1188.*

MTH 1192 Pre-Calculus**4 QH**

Focuses on logarithms, trigonometric functions of angles in degrees and radians, trigonometric identities and equations, right triangles, oblique triangles, complex numbers in trigonometric

form, systems of equations, and determinants. The TI-85 graphics calculator is required for this course. (Equivalent to MTH 1189.) *Prereq.* MTH 1191 or MTH 4107; BSET majors only.

MTH 1193 Calculus 1**4 QH**

Focuses on plane analytic geometry; differentiation of algebraic functions; rate, motion, maximum and minimum problems; derivatives of higher order; curve sketching; basics in functions, limits, and continuity. (Not equivalent to MTH 1123.) *Prereq.* MTH 1192 or MTH 4108; BSET majors only.

MTH 1194 Calculus 2**4 QH**

Focuses on applications of derivatives to curve sketching; anti-differentiation; the definite integral, with applications; calculus of nonalgebraic functions — logarithmic, exponential, and trigonometric; calculus of inverse trigonometric functions; techniques of integration; indeterminate forms; and L'Hopital's rule. (Not equivalent to MTH 1124.) *Prereq.* MTH 1193 or MTH 4120; BSET majors only.

MTH 1195 Calculus 3**4 QH**

Focuses on polar coordinates, vectors in a plane, calculus of functions of several variables, partial differentiation, multiple integrals, infinite series, vector analysis, and introduction to differential equations. (Not equivalent to MTH 1125.) *Prereq.* MTH 1194 or MTH 4121; BSET majors only.

MTH 1203 History of Mathematics**4 QH**

Traces the development of the various branches of mathematics from ancient times to the present, with emphasis on the mathematics itself as well as the mathematicians and cultures that produced it. Teaches students to compute in other number systems, to perform geometric constructions, and to learn proofs of some significant theorems. (III) *Prereq.* Interest in history and mathematics.

MTH 1212 Linear Programming**4 QH**

Presents an introduction to concepts and techniques of linear programming, game theory, discrete modeling (shortest path, minimum spanning tree). Explores application to economics, social sciences, and other related fields. (II) *Prereq.* One year of college mathematics.

MTH 1223 Calculus for Engineering Majors 4**4 QH**

Covers partial derivatives and multiple integrals, with applications. *Prereq.* MTH 1125.

MTH 1225 Differential Equations (Engineering) 1**4 QH**

Studies ordinary differential equations with applications. Focuses on first-order equations and second-order linear equations from various points of view: existence theory, analytic solution techniques, and numerical methods. Introduces linear algebra, including eigenvalues and eigenvectors to study systems of equations. Computer labs are used for visualization and numerical approximation. *Prereq.* MTH 1125 or equivalent.

MTH 1226 Differential Equations (Engineering) 2**4 QH**

Studies partial differential equations with applications. Discusses mathematical models, boundary and initial conditions, Fourier series, and solutions to the wave, diffusion, and Laplace's equation. Computer labs are used for visualization and numerical approximation. *Prereq.* MTH 1245 or equivalent.

MTH 1230 Linear Algebra for Engineers**4 QH**

Introduces matrices through Gaussian elimination. Proceeds to vector spaces and linear equations; orthogonality; eigenvalues and eigenvectors. Emphasizes engineering applications such as systems of ordinary differential equations. *Prereq.* MTH 1225.

MTH 1238 Combinatorial Mathematics**4 QH**

Introduces techniques of mathematical proofs, including mathematical induction. Explores various techniques for counting such as permutation and combinations, inclusion-exclusion, Pólya enumeration, and the mathematical formulations necessary for these techniques, including elementary group theory and equivalence relations. *Prereq.* Two courses in calculus.

MTH 1240 Chaos and Fractals**4 QH**

Presents an experimental study, using simple mathematical models, of chaotic behavior in dynamical systems found in mathematics, science, and computer science. Goals include the development of experimental skills, integration of visual and analytical modes of thought, and an appreciation of issues of problem formulation and representation. *Prereq.* MTH 1125, MTH 1137, and COM 1201 or equivalent.

MTH 1243 Calculus for Science Majors 4**4 QH**

Focuses on methods of calculus and vector analysis to study curves, surfaces, and functions of several variables. Studies parameterization of lines and planes, tangents and normal vectors, partial derivatives, maxima and minima problems, linear approximations, and tangent planes. Some linear algebra. *Prereq.* MTH 1142.

MTH 1244 Calculus for Science Majors 5**4 QH**

Continues MTH 1243. Covers multiple integration, line integrals, and exact differentials; various forms of Stoke's theorem; and more linear algebra. *Prereq.* MTH 1243.

MTH 1245 Differential Equations (Science) 1**4 QH**

Studies ordinary differential equations with applications including mechanical vibrations and electrical circuits. In particular, first-order equations and systems and second-order linear equations are studied from various points of view: existence theory, analytic solution techniques (including Laplace transform), and numerical methods. Computer labs are used for visualization and numerical approximation. *Prereq.* MTH 1125 or equivalent.

MTH 1246 Differential Equations (Science) 2**4 QH**

Studies partial differential equations with applications. Discusses mathematical models, boundary and initial conditions, Fourier series, and solutions to the wave, diffusion, and Laplace's equation. Computer labs are used for visualization and numerical approximation. *Prereq.* MTH 1125 or equivalent.

MTH 1301 Linear Algebra 1**4 QH**

Focuses on vectors and vector spaces, including function spaces, subspaces. Examines lengths, angles, scalar products; volumes, determinants; linear independence and dependence, dimension, linear and affine maps, kernel and image. Studies algorithms: row operations, double triangular form, inversion. Introduces linear maps. Gives particular attention to characteristic polynomials, eigenvalues, and eigenvectors in low dimensions. *Prereq.* MTH 1244 or equivalent.

MTH 1302 Linear Algebra 2**4 QH**

Focuses on detailed study of linear maps. Studies symmetric maps and quadratic forms, isometries, skew-symmetric maps; decomposition of general linear maps using symmetric maps and isometries. Covers polynomials evaluated on linear maps, generalized eigenspaces, Jordan form. As time permits, introduces computational methods, with emphasis both on geometry underlying algorithms and on practical advantages and limitations. Surveys related areas in mathematics in which linear ideas play a role. *Prereq.* MTH 1301.

MTH 1311 Real Analysis 1**4 QH**

Provides the theory and technique for a rigorous treatment of calculus. Topics vary and may include the construction of the real numbers, continuity and convergence, differentiation and integration, and proofs of selected results such as the inverse and implicit function theorems. Emphasizes careful proofs throughout. *Prereq.* MTH 1137 or permission of instructor.

MTH 1312 Real Analysis 2**4 QH**

Continues MTH 1311. Focuses on calculus, applying the concepts introduced in MTH 1311. *Prereq.* MTH 1311.

MTH 1321 Introduction to Groups and Their Applications**4 QH**

Presents examples of groups (symmetry groups, permutation groups, matrix groups, cyclic groups) and their subgroups. Studies finite groups and orders of subgroups; homomorphisms and normal subgroups. Also considers applications to some of the following, depending on time and interest: geometry, number theory, crystallography, physics, and combinatorics.

MTH 1322 Topics in Rings, Fields, and Number Theory**4 QH**

Introduces commutative rings, ideals, integral domains, fields, and Galois theory. Studies extension fields, Gaussian integers, and other topics as time permits. *Prereq.* MTH 1321.

MTH 1330 Number Theory**4 QH**

Introduces the elementary methods of analytic number theory. Focuses on divisibility, congruences, arithmetical and multiplicative functions, quadratic reciprocity, and equivalent formulations of the prime number theorem. *Prereq.* MTH 1301 or permission of instructor.

MTH 1337 Foundations of Mathematics 1**4 QH**

Studies the following topics and the shifts in perspective that their development brought about: disputes over the basis for calculus, twentieth-century discoveries in mathematical logic, and the advent of the computer. (V)

MTH 1338 Foundations of Mathematics 2**4 QH**

Includes set theory, rules for set formation, the axiom of choice and its role in mathematics, transfinite cardinal and ordinal numbers and arithmetic, and axiomatizations of set theory.

MTH 1347 Applied Analysis**4 QH**

Demonstrates the application of mathematics to interesting physical and biological problems. Examines methods chosen from ordinary and partial differential equations, calculus of variations, Laplace transforms, singular perturbations, special functions, dimensional analysis, and other techniques of applied mathematics. *Prereq.* MTH 1246 or permission of instructor.

MTH 1349 Numerical Analysis 1**4 QH**

Presents various topics including roots of nonlinear equations, systems of linear equations, interpolation, curve-fitting, and approximation of functions. Emphasizes understanding issues such as how good a numerical solution is or how efficient a method is, rather than theorem-proving or numerical recipes.

MTH 1350 Numerical Analysis 2**4 QH**

Analyzes problems in differential equations, integration, and ordinary differential equations. (Does not require prior knowledge of differential equations; MTH 1349 is not a prerequisite.) Emphasis is similar to that of MTH 1349.

MTH 1351 Functions of a Complex Variable 1**4 QH**

Focuses on algebra and geometry of complex numbers; concepts of limit, continuity, and derivative in the complex domain; holomorphic functions, series, contour integration; and applications. *Prereq.* MTH 1243 or equivalent.

MTH 1352 Functions of a Complex Variable 2**4 QH**

Continues MTH 1351. May include conformal mapping, analytic continuation, Riemann surfaces, the Laplace transform and inverse transform, elliptic functions, and applications. *Prereq.* MTH 1351.

MTH 1367 Geometry**4 QH**

Studies classical Euclidean geometry and symmetry groups of geometric figures by an analytic approach. Teaches how to formulate mathematical propositions precisely and how to construct and understand mathematical proofs. Provides a line between classical and modern geometry with the aim of preparing students for further study in group theory and differential geometry. *Prereq.* Basic linear algebra or permission of instructor.

MTH 1370 Recent Ideas in Geometry**4 QH**

Covers a selection of recently created concepts from geometrical fields of study. Topics may include elliptic and hyperbolic non-Euclidean geometries, the classification of isometries in the plane, the theory of regular polytopes in higher dimensions, the study of tessellations of the plane and Penrose nonperiodic tilings, the topological study of knots, the classification of surfaces, computational algebraic geometry, and examples of three-manifolds such as the three-sphere and the Poincaré dodecahedral space. *Prereq.* MTH 1367 or permission of instructor.

MTH 1384 Probability for Engineering**4 QH**

Discusses sample spaces; axioms of probability; random variables and their distributions; expectation, moments, and characteristic function; bivariate distributions; jointly Gaussian random variables; stochastic processes, including autocorrelation function and power spectral density; and estimation of the mean and autocorrelation function in the presence of noise. *Prereq.* MTH 1223 and MTH 1225 or equivalent.

MTH 1387 Probability 1**4 QH**

Focuses on probability functions for finite and infinite spaces; conditional probability and independence; discrete and continuous probability distributions for one or more random variables; expectation; moments; binomial, Poisson, and normal distributions; Law of Large Numbers; and central limit theorem. *Prereq.* MTH 1223 or MTH 1244.

MTH 1388 Probability 2**4 QH**

Studies selected topics, including introduction to stochastic processes, with emphasis on Markov chains or random walk. *Prereq.* MTH 1384 or MTH 1387.

MTH 1390 Mathematical Statistics**4 QH**

Focuses on estimation of parameters, confidence intervals, hypothesis testing, regression, sampling distributions. *Prereq.* MTH 1384 or MTH 1387.

MTH 1714, MTH 1723, MTH 1724, MTH 1725, MTH 1726, MTH 1733, MTH 1734, MTH 1735, MTH 1740, MTH 1741, MTH 1742, Honors Program**4 QH each**

Special sections for honors students of courses MTH 1114, MTH 1123, MTH 1124, MTH 1125, MTH 1223, MTH 1133, MTH 1134, MTH 1135, MTH 1140, MTH 1141, and MTH 1142 respectively.

MTH 1763 Introduction to Computers (Honors)**4 QH**

Honors equivalent of MTH 1163.

MTH 1801, MTH 1802, MTH 1803, MTH 1804, MTH 1805, MTH 1806, MTH 1807, MTH 1808 Directed Study**4 QH**

Gives highly motivated students the opportunity to explore mathematical situations and theories in depth. Can be used as an opportunity to examine familiar material in fresh ways or to explore new material not offered in formal courses. Provides students strong in mathematics and the related sciences a chance to develop the art and skill needed to work independently and creatively in mathematics. *Prereq.* Permission of instructor. *Students strong in mathematics are permitted to enroll in graduate mathematics courses.*

MTH 1809 Directed Study: Problem Solving**4 QH**

Emphasizes mathematical problem-solving techniques from a range of areas, including but not limited to integration, differentiation, number theory, group theory, field theory, combinatorics, linear algebra, differential equations, and mathematical modeling. The mathematical model aspect constitutes one third to one half of the course. Analyzes specific realworld models in complete detail, including running and analyzing computer simulations. Requires students to make a number of presentations to the class demonstrating specific techniques. *Prereq.* Permission of instructor.

MTH 1810 Directed Study**1 QH**

Same description as MTH 1801 to MTH 1808. Offered for less intensive projects. *Prereq.* Permission of instructor.

MTH 1811 Directed Study**2 QH**

Same description as MTH 1801 to MTH 1808. Offered for less intensive projects. *Prereq.* Permission of instructor.

MTH 1825, MTH 1826, MTH 1827, MTH 1828**Junior/Senior Honors Project****4 QH each**

For details contact the honors office.

Modern Languages

Prerequisites listed for modern languages are based on current course numbers at Northeastern. If approved by the Department of Modern Languages and the dean's office, equivalent course work acquired elsewhere may be considered acceptable to satisfy these prerequisites. The following courses are offered in English, and no knowledge of a foreign language is required to take them: LNF 1510, LNF 1511, LNF 1512, LNF 1513, LNI 1510, LNI 1511, LNI 1512, LNR 1500, LNR 1510, LNR 1511, LNS 1500, LNS 1501, and LNS 1510. Locate these courses under the appropriate heading for course descriptions. Language majors interested in obtaining major credit for any of these courses should consult their instructor.

Cinema

The following cinema courses are offered by the Department of Modern Languages. For more information on the cinema studies minor and a listing of all cinema studies courses see page 32. These courses are conducted in English and no knowledge of a foreign language is required to take them. Locate these courses under the appropriate heading for course descriptions. Language majors interested in obtaining major credit for any of these courses should consult their instructor.

- LNF 1521 French Film and Culture**
- LNF 1550 Introductory Film Analysis**
- LNF 1551 Film Theory**
- LNF 1560 Film and Psychoanalysis**
- LNG 1554 Modern German Film and Literature**
- LNS 1550 Spanish Civil War in Spanish Film**

Linguistics

The following linguistics courses are offered by the Department of Modern Languages. For more information on the linguistics major or minor and a listing of all linguistics courses see page 57. These courses are conducted in English and no knowledge of a foreign language is required to take them. Locate these courses under the appropriate heading for course descriptions. Language majors interested in obtaining major credit for any of these courses should consult their instructor.

- LNF 1250 History of the French Language**
- LNL 1235 Applied Linguistics**
- LNL 1260 Introduction to Romance Linguistics**
- LNS 1250 History of the Spanish Language**

Literature and Culture (taught in English)

The following courses are conducted in English and no knowledge of a foreign language is required to take them. Locate these courses under the appropriate heading for course descriptions. Language majors interested in obtaining major credit for any of these courses should consult their instructor.

- LNF 1510 Modern Philosophical French Literature in Translation**
- LNF 1512 Introduction to Literature**
- LNI 1510 The Works of Dante in Translation 1**
- LNI 1511 The Works of Dante in Translation 2**
- LNI 1512 Italian Seminar: Pirandello**
- LNR 1500 Backgrounds in Russian Culture**
- LNR 1510 The Works of Alexander Pushkin in Translation**
- LNR 1511 Russian Literature in Translation**
- LNS 1500 Backgrounds in Hispanic Culture**
- LNS 1501 Backgrounds of Latin American Culture**
- LNS 1506 Cervantes and His Times**
- LNS 1510 Saints and Sinners: The Vision of Women in the Middle Ages and the Renaissance**
- LNS 1511 Introduction to Caribbean Literature**
- LNS 1512 The Don Juan Figure in Literature**

French

LNF 1101 Elementary French 1 **4 QH**
Designed for students with very little or no prior knowledge of French, this course provides a lively introduction to basic oral expression, listening comprehension, and elementary reading and writing. The audiolingual approach, using practical vocabulary

drawn from realistic situations, aims at good pronunciation and ease in response. Each lesson incorporates helpful information about daily life in France and the varied cultures within the world of French speakers. Laboratory practice complements classwork, enables students to work aloud at their own speed, reinforces their acquisition of essential structures, and acquaints them with a vast library of audiovisual resources.

LNF 1102 Elementary French 2 **4 QH**
Continues beginners' exposure to the "four skills"—oral comprehension, speaking, reading, and writing French—so that the linguistic tools needed to understand and function in foreign contexts—at home, abroad, and in the world of literature and film—may be acquired. *Prereq.* LNF 1101.

LNF 1103 Intermediate French 1 **4 QH**
Designed for students who wish to further their audiolingual skills and improve their reading and writing; combines a review and continued study of grammar essentials with oral, writing, and language lab practice. Varied readings include journalistic, cultural, and modern literary texts. Conducted primarily in French so that students may exercise their new skills. *Prereq.* LNF 1102 or equivalent.

LNF 1104 Intermediate French 2 **4 QH**
Uses the fundamentals of French to promote effective self-expression through speaking and writing and to explore the idiomatic aspects of the language. Through progressive class discussions and oral and written commentaries, students analyze a contemporary French novel or a French cultural reader, screenplay, or collection of short stories. The course strives, first, to help students read and comprehend modern French writing with confidence, and to be able to talk and write about it in good French; and second, to provide preparation for advanced courses. *Prereq.* LNF 1103.

LNF 1107 Reading French in the Arts and Sciences **4 QH**
Designed for students who wish to develop their reading skills, without regard to other aspects of the language such as speaking and writing. Stresses the grammar necessary for reading, together with vocabulary building. Uses scientific and nonscientific texts. May help graduate and undergraduate students who need to pass a reading examination to fulfill specific degree requirements. *Not a substitute for LNF 1103 or LNF 1104.*

LNF 1111 Elementary French for Business **4 QH**
Similar to LNF 1101, but has added features relevant to business students, such as specialized vocabulary related to the business world and an immediate introduction to French business texts. *LNF 1102 may be taken as a sequel to LNF 1111.*

LNF 1140 Intensive Intermediate French **8 QH**
Continues study of French to further audio-lingual skills and improves reading and writing. Seeks to prepare students for advanced French courses. *Prereq.* LNF 1102.

LNF 1201 Intensive Review of French **4 QH**
Reviews the principal structures of French in order to equip students with the knowledge that they will need to participate in advanced courses. Stresses vocabulary expansion, grammar review and drills, comprehension, and reading and speaking skills. Required of all French majors, it serves as prerequisite for all other French courses at the 1200 level. Conducted largely in French. Non-majors are invited as well, as this course is an excellent way to review previous French study.

LNF 1202 Advanced French Proficiency 1**4 QH**

Focuses on the students' particular grammar needs as well as the nuances of the language. Designed for qualified students who wish to work on improving their proficiency in speaking and writing French through oral reports, class discussions, compositions, and an advanced review of fundamentals. Varied readings in a range of styles—popular to literary—provide insight into French life and culture. Conducted in French. *Prereq.* LNF 1201 or equivalent.

LNF 1203 Advanced French Proficiency 2**4 QH**

Emphasizes further vocabulary building and mastery of fine points of grammar through written composition, prepared oral reports, and reading and discussion of articles from current periodicals. Gives special attention to the latest trends in spoken and written French and the study of idioms. *Prereq.* LNF 1202 or equivalent.

LNF 1204 Advanced French Proficiency 3**4 QH**

Continues LNF 1203. Each student is expected to pursue one major project throughout the course, to be completed at the end of the quarter—such as planning and writing an original French magazine with one article to be submitted each week of the term. *Prereq.* LNF 1203 or equivalent.

LNF 1225 Introduction to the French-Speaking World**4 QH**

Offers a cultural introduction to the French-speaking world through the study of various reading selections in the textbook *Le Monde Français*. Stresses vocabulary building and proper usage of a wide variety of grammatical forms; also examines the traditional backgrounds and aspects, as well as the contemporary and “pop” aspects, of the cultural heritage of the world's French speakers. Focuses mainly, but not exclusively, on France. *Prereq.* LNF 1104 or equivalent.

LNF 1231 Masterpieces of French Literature 1**4 QH**

Provides an introduction to French poetry, theatre (both comedy and tragedy), novels, and autobiographies through the study of key works from the Middle Ages and Renaissance through the Age of Enlightenment. Includes such writers as Villon, Molière, Racine, Voltaire, and Rousseau. Conducted largely in French. Designed to foster a critical approach to reading, improve reading, speaking, and writing skills; and help students apply these new skills to a greater understanding and appreciation of major French contributions to Western and Francophone culture. Encourages group discussions in an effort to bring out the relation between the texts and contemporary issues. (II) *Prereq.* LNF 1201 or equivalent.

LNF 1232 Masterpieces of French Literature 2**4 QH**

Continues LNF 1231, which is not a prerequisite. Presents some of the most interesting and significant works of literature from the Romantic Age to the present. Readings may include an “existential” play by Musset, poetry by Baudelaire and Verlaine, and fiction by Flaubert, Camus, and Robbe-Grillet. For a description of methodology, see LNF 1231. (II) *Prereq.* LNF 1201 or equivalent.

LNF 1250/LIN 1245 History of the French Language**4 QH**

Examines the development and emergence of the French language from its earliest literary manifestations. Offers the opportunity to become familiar with the language's earlier stages. Emphasizes developing a working knowledge of medieval French. Includes the relationship of Old French to Latin, structural characteristics of Old French, and the impact of historical events on language. Compares different stages of French. Conducted in English. *Prereq.* Reading knowledge of French or permission of instructor.

LNF 1305 French Literature in the Seventeenth Century**4 QH**

Presents a study of the nondramatic literature of seventeenth-century France from the baroque through the classical periods. Covers a rich and diverse body of writing encompassing philosophy, poetry, the table, the novel, and epistolary writing. Among the authors treated are Descartes, Pascal, La Rochefoucauld, La Fontaine, Boileau, Mme. de Sevigne, and Mme. de La Fayette. Offered in alternate years. *Prereq.* LNF 1232 or equivalent.

LNF 1306 French Theatre in the Seventeenth Century**4 QH**

Studies the dramatic literature of seventeenth-century France, from the baroque through the classical periods. Studies tragedy in the works of Corneille and Racine; comedy, in those of Molière. Offered in alternate years. *Prereq.* LNF 1232 or equivalent.

LNF 1307 French Literature in the Eighteenth Century 1**4 QH**

Studies the eighteenth century in France, known as the Age of Enlightenment. It was an age of challenge to established authority in all areas and an age of changing ideas and ideals. This intellectual and political vitality is reflected in the representative works of Marivaux, Montesquieu, Prévost, and Voltaire. Class work includes discussions, oral and written reports. Conducted in French, but English is allowed. Offered in alternate years. *Prereq.* LNF 1232 or equivalent.

LNF 1308 French Literature in the Eighteenth Century 2**4 QH**

Focuses on the latter half of the century when we begin to see both the achievements brought about by the spirit of enlightenment and the awakening of the romantic sensibility, in such authors as Diderot, Rousseau, St. Pierre, Laclos, and Beaumarchais. Class work includes discussions, oral and written reports. Conducted in French, but English is allowed. Offered in alternate years. *Prereq.* LNF 1232 or equivalent.

LNF 1309 French Literature of the Nineteenth Century 1**4 QH**

Treats romanticism as a major cultural phenomenon. Examines romanticism in poetry and drama, as well as its continuation into the realist novel. Readings include Victor Hugo in poetry and the drama and Honoré de Balzac in the novel, as well as selections from other writers who represent aspects of romanticism and realism. Conducted in French. Offered every other year. *Prereq.* LNF 1232 or equivalent.

LNF 1310 French Literature of the Nineteenth Century 2**4 QH**

Explores the reaction against romanticism: aestheticism and personal modes of expression in contrast to the style of the early romantics. Readings include a novel by Gustave Flaubert and the verse of Charles Baudelaire in *Les Fleurs du Mal*, as well as the poets who followed in his footsteps. Considers Flaubert and Baudelaire as precursors of modern literature. Conducted in French. Offered every other year. *Prereq.* LNF 1232 or equivalent.

LNF 1311 French Literature of the Twentieth Century 1**4 QH**

Offers a study of the major movements in the narrative and dramatic prose writers up to 1950, including Proust, A. France, Colette, Anouilh, and Camus. Requirements include reading a work from each author, discussing it in class, and presenting oral and written reports. Conducted in French. Offered in alternate years. *Prereq.* LNF 1232 or equivalent.

LNF 1312 French Literature of the Twentieth Century 2**4 QH**

Continues the study of the 20th century French literature, with an emphasis on the literary journal from Gide to J. Green. Requirements include reading a work from each author, discussing it

in class, and presenting oral and written reports in French. Conducted in French. Offered every other year. *Prereq.* LNF 1232 or equivalent.

LNF 1315 French Poetry, Past and Present 4 QH
Provides students with a survey of French poetry through the ages, focusing on representative works of the major French poets. Studies poems in their literary and historical context, with an examination of various aspects of French versification. Conducted in French.

LNF 1405 Topics in French 4 QH
Provides an in-depth study of specific structural aspects of the French language. Subjects will vary from year to year. *Prereq.* LNF 1102 or equivalent.

LNF 1510 Modern Philosophical French Literature in Translation 4 QH
Studies the works of Camus and Sartre, who are considered the spokesmen for their generation's philosophical concerns. Develops a working knowledge of existentialism. Conducted in English.

LNF 1512 Introduction to Literature 4 QH
Uses major representative works of fiction from the modern European tradition to introduce students to an array of theoretical and critical perspectives (cognitivism, marxism, formalism, and identity politics). Major authors include Dostoevsky, Mann, Kafka, Camus, Duras, and Achebe. Team taught in English by members of the modern language department. Serves as an introduction to literature for language majors, who can get credit in their field of concentration by reading some of the works in the original language.

LNF 1521 French Film and Culture 4 QH
Provides an introduction to some of the qualities that have made French film one of the great national cinemas. Focuses on both form and content; relates outstanding directors' major works to the French culture and society of their period. Taught in English; may be taken for French credit if assignments are completed in French. (IV)

LNF 1550 Introductory Film Analysis 4 QH
Provides a basic introduction to film art and compares and contrasts three styles of filmmaking: expressionism, surrealism, and realism as they have been used in Hollywood cinema and the European art cinema. May be taken for French or German credit with permission of the instructor.

LNF 1551 Film Theory 4 QH
Investigates the fundamental issues surrounding the nature and possibilities of film art. Introduces a variety of theoretical approaches, including semiotics, auteur theory, psychoanalysis, and feminism. Weekly screenings focus on two or three topics: a film author (such as Buñuel, Truffaut, or Welles), a well-defined film movement (such as neorealism, the New German cinema, or the French New Wave), or films about film-making practice. Coursework includes reading articles and writing a research paper using the resources (including film journals) of the Media Center of Snell Library. (V)

LNF 1560 Film and Psychoanalysis 4 QH
Explores the nature and possibilities of the psychoanalytic interpretation of film, demonstrating that such an approach offers an additional dimension to the analysis of a work of art. Focuses on elements in the work that are derivative of unconscious processes,

especially fantasies, dreams, symbolism, and imagery. Discusses material in the works studied that relates to neurotic conflicts, character structure and formation, interpersonal relationships, and distortions in psychological development. Weekly film screenings will be accompanied by lectures and discussions; each student will select one film (placed on reserve in the Media Center of Snell Library) for individual study on a topic of his/her choice.

LNF 1801, LNF 1802, LNF 1803, LNF 1804, LNF 1805 Directed Study 4 QH each
Offers students a way of going beyond work given in the regular curriculum; may also enable students to complete major or minor requirements in certain situations. Will not be given in areas adequately covered by existing courses. Priority given to language majors and to juniors and seniors.

LNF 1820, LNF 1821, LNF 1822, LNF 1823 4 QH each
Junior/Senior Honors Project
For details contact the honors office.

German

LNG 1101 Elementary German 1 4 QH
Examines basic grammatical structure of German through practice in listening comprehension, speaking, reading, and writing. Includes classroom and language lab instruction. No previous study of German necessary. (Special sections of this course are run for business students.)

LNG 1102 Elementary German 2 4 QH
Continues LNG 1101. Emphasizes knowledge of the basic grammatical structure of German and flexibility in the four language skills. (Special sections of this course are run for business students.) *Prereq.* LNG 1101 or equivalent.

LNG 1103 Intermediate German 1 4 QH
Offers a comprehensive review and reinforcement of the major aspects of German grammar and usage; continues to explore the four major skills of listening comprehension, speaking, reading, and writing; introduces the student to the reading of contemporary literary texts, including a full-length play—*Biedermann und die Brandstifter*, by the Swiss playwright Max Frisch. *Prereq.* LNG 1102 or equivalent.

LNG 1104 Intermediate German 2 4 QH
Offers an opportunity to increase vocabulary as well as flexibility in the four basic language skills. Topics include grammar review, continued exposure to modern literary texts. One full-length play is read—*Der Besuch der alten Dame*, by the contemporary Swiss dramatist Friedrich Dürrenmatt. Successful completion entitles the student to choose from among the upper-level course offerings in the areas of German literature and/or composition and conversation. *Prereq.* LNG 1103 or equivalent.

LNG 1107 Reading German 4 QH
Offers an opportunity to develop reading skills, disregarding other aspects of the language, such as speaking or writing. Stresses grammar necessary for reading, together with vocabulary building; scientific and nonscientific texts are read. Provides assistance to students, graduate and undergraduate, who need to pass a reading examination to fulfill specific degree requirements.

LNG 1111 Business German I**4 QH**

Provides an introduction to written German in business administration usage as found in general-purpose professional texts. Develops grammatical knowledge and competence in reading comprehension, translation, and phonetic accuracy. Considers the Federal Republic of Germany as an internationally leading economic power. Discusses weekly readings (in English) from trade publications on aspects of the German business world, including foreign and U.S. trade. Assumes no prior knowledge of German.

LNG 1140 Intensive Intermediate German**8 QH**

Continues study of German to further audio-lingual skills and improves reading and writing. Seeks to prepare students for advanced German courses. *Prereq.* LNG 1102.

LNG 1201 German Composition and Conversation 1**4 QH**

Strives to develop facility in speaking and writing German and stresses active use of the language. Provides an opportunity for practice in listening comprehension through German language films or tape-recorded interviews with native German speakers; expansion of vocabulary through guided group discussions on topics of general interest; and development of language skills in areas of individual interest through preparation of oral reports in German. Includes weekly composition assignments and grammar reviews as needed. Language lab. Recommended for students preparing for co-op in Germany. *Prereq.* LNG 1104 or equivalent.

LNG 1202 German Composition and Conversation 2**4 QH**

Continues German LNG 1201 in content and format with emphasis on independent communication skills. Recommended for students preparing for co-op in Germany. *Prereq.* LNG 1201 or equivalent.

LNG 1231 Masterpieces of German Literature 1**4 QH**

Surveys the major trends in the development of German literature from the Hildebrandslied to Martin Luther. Includes reading of selected works of major authors of the twentieth century such as Hauptmann, Kafka, Mann, Brecht, Durrenmatt, and Boll. Works read in a particular term will be based partially on theatre performances or film showings planned in the Boston area. Class attendance of these performances is anticipated. Recommended as an introductory step to literature courses LNG 1307 and above. Offered every other year, alternating with LNG 1232. *Prereq.* LNG 1104 or equivalent.

LNG 1232 Masterpieces of German Literature 2**4 QH**

Studies short fiction from Goethe to the present. Includes Goethe's *Die Leiden des Jungen Werthers*, ETA Hoffman's stories of fantasy and madness, Thomas Mann's *Der Tod in Venedig*, and Franz Kafka's *Die Verwandlung*, as well as stories by Böll, Grass, Christa Wolff, and others. Complements readings and lectures in German with musical and screen adaptations of the works. Recommended as an introduction to literature courses LNG 1307 and above. May be taken before LNG 1231. *Prereq.* LNG 1104 or equivalent.

LNG 1309 German Literature of the Nineteenth Century**4 QH**

Offers background and general survey of German literature of the nineteenth century, with particular attention to prose and lyric poetry. Includes poems of all the important romantic poets, beginning with Holderlin, Tieck, Novalis, and extending through Morike. Discusses Novellen by Eichendorff, Tieck, Chamisso, Kleist, Fougue, Keller, Meyer, and Ludwig. Lectures (in German) and reports. *Prereq.* LNG 1232 or equivalent.

LNG 1311 German Literature of the Twentieth Century**4 QH**

Considers lyric poetry and prose works of important German writers of the twentieth century, including Schnitzler, Hauptmann, Mann, and Kafka. Lectures (in German) and reports. *Prereq.* LNG 1232 or equivalent.

LNG 1405 Topics in German**4 QH**

Provides an in-depth study of specific structural aspects of the German language. Subjects will vary from year to year. *Prereq.* LNG 1102 or equivalent.

LNG 1554 Modern German Film and Literature**4 QH**

Introduces contemporary issues in German culture. Studies the importance of the Faust legend as a striving for *Unendlichkeit*—going beyond normal human limitations—as expressed in the classicism of Goethe and the expressionist movement in art and film. Explores the balancing of Weimar as compared to Nazi culture. Examines the multiple pressures and complex issues of the post-war era as outgrowths of these earlier periods. Considers major novels, stories, and poems by Boll, Grass, Mann, and Brecht as adapted by a generation of new German filmmakers—Fassbinder, Schlöndorff, Sanders-Brahms, and Wenders. Conducted in English; may be taken for German credit by special arrangement. (IV)

LNG 1801, LNG 1802, LNG 1803, LNG 1804, LNG 1805**4 QH each****Directed Study**

Offers students a way of going beyond work given in the regular curriculum and may also serve as a means to complete major or minor requirements in certain situations. Directed studies will not be given in areas adequately covered by existing courses. Priority is given to language majors and to juniors and seniors.

LNG 1820, LNG 1821, LNG 1822, LNG 1823**4 QH each****Junior/Senior Honors Project**

For details contact the honors office.

Italian**LNI 1101 Elementary Italian 1****4 QH**

Offers the beginner who wants instruction in the essentials of Italian grammar and opportunity to practice speaking and reading the language.

LNI 1102 Elementary Italian 2**4 QH**

Continues study of grammar and basic language skills. Practices advanced conversation and reading. *Prereq.* LNI 1101 or equivalent.

LNI 1103 Intermediate Italian 1**4 QH**

Reviews grammar. Offers progressively more intensive practice in oral and written communication. Selects readings from modern texts. *Prereq.* LNI 1102 or equivalent.

LNI 1104 Intermediate Italian 2**4 QH**

Reviews grammatical difficulties, with attention given to current idiomatic forms. Greater emphasis on self-expression. Reading of short stories or a modern novel. *Prereq.* LNI 1103 or equivalent.

LNI 1201 Italian Composition and Conversation 1**4 QH**

Aims at helping students strengthen speaking and writing ability through an analysis of the language, oral and written reports, and general discussions on a variety of topics. For students who have mastered the fundamentals of the language. There will be no study of grammar as such. Conducted entirely in Italian. *Prereq.* LNI 1104 or equivalent.

LNI 1202 Italian Composition and Conversation 2 4 QH
Continues LNI 1201. Stresses individual work, free discussions, and compositions. Conducted entirely in Italian. *Prereq.* LNI 1201 or equivalent.

LNI 1311 Italian Literature of the Twentieth Century 1 4 QH
Explores some of the novels, plays, and poems from a variety of literary trends and styles that evolved between the turn of the century and World War II. Studies authors such as Verga, Pascoli, D'Annunzio, Pirandello, Deledda, and Svevo. Oral and written reports. Conducted in Italian, but students may use English. Offered in alternate years. *Prereq.* LNI 1232 or equivalent.

LNI 1312 Italian Literature of the Twentieth Century 2 4 QH
Examines the postwar period to the present. Considers the many important authors since the early forties, and their books reflecting the preoccupations, moods, and aspirations of our changing times. Includes writers such as Moravia, Silone, Vittorini, Pavese, Guareschi, Buzzati, Sciascia, Ungaretti, Montale, and Quasimodo. Requires oral and written reports. Conducted in Italian, but students may use English. Offered in alternate years. *Prereq.* LNI 1232 or equivalent.

LNI 1510 The Works of Dante in Translation 1 4 QH
Considers briefly the cultural background and various literary schools that influenced Dante. His life, his character, and minor works are discussed. The *Vita Nuova* and the first cantica of the *Divina Commedia*, the "Inferno," are read and analyzed in some detail. This course is intended for students of any background or major. Bilingual texts are used so that students with a background in Italian and others, may refer to the original for added interest and enrichment. Conducted in English. (III)

LNI 1511 The Works of Dante in Translation 2 4 QH
Continues LNI 1510, but may be taken separately. Studies in detail the other two parts of the *Divina Commedia*, "Purgatorio" and "Paradiso." Open to anyone. Bilingual texts used. Conducted in English.

LNI 1512 Italian Seminar: Pirandello 4 QH
Examines the originality and art of Pirandello by a close study of some of his great plays and short stories. Classwork includes discussions and oral and written reports. Conducted in English.

LNI 1801, LNI 1802, LNI 1803, LNI 1804, LNI 1805 Directed Study 4 QH each
Offers students a way of going beyond work given in the regular curriculum and may also serve as a means to complete major or minor requirements in certain situations. Directed studies will not be given in areas adequately covered by existing courses. Priority is given to language majors and to juniors and seniors.

LNI 1820, LNI 1821, LNI 1822, LNI 1823 4 QH each
Junior/Senior Honors Project
For details contact the honors office.

Linguistics

LNI 1220/LIN 1220 Introduction to Phonetics and Phonology 4 QH
Explores the acoustic and articulatory basis of phonology. Emphasizes hands-on experience with standard areas in modern phonology, including phonetics, phonetic variation, natural classes of sounds, phoneme alternations, rule systems, and prosodic phonology. Introduces major contemporary theories including autosegmental phonology and feature geometry.

LNI 1235/LIN 1235 Applied Linguistics 4 QH
Explores the solution of language-based re-world problems. Solutions to these problems depend on information not only from linguistics, but also from a variety of other disciplines such as anthropology, sociology, education, ethnic and area studies (including literature), and public administration. Studies the relationship of linguistics to applied linguistics; second language acquisition; second and foreign language teaching; language policy and planning; and the linguistic aspects of multiculturalism.

LNI 1240/LIN 1240 Bilingualism 4 QH
Focuses on the fact that half of the world's population is bilingual, that is, uses two or more languages on a regular basis. Also explores the fact that bilingualism remains a poorly understood phenomenon surrounded by a number of myths: those that hold that bilinguals are found in bilingual countries and are equally fluent in their languages; that bilingual children suffer from cognitive impoverishment; bilingual education hinders the assimilation of minority groups. Reviews all aspects of bilingualism (in the world, in society, in the child, and in the adult). Discusses topics such as biculturalism and language change.

LNI 1260/LIN 1260 Introduction to Romance Linguistics 4 QH
Provides a general linguistic introduction to one of the most important language families. Discusses the structural characteristics of several Romance languages. Includes defining a language family, how and why languages change, and the relationship of standard and nonstandard linguistic varieties. Studies contemporary theoretical issues in Romance linguistics including object pronoun placement, word order, creolization, and subject pronouns use. Conducted in English. *Prereq.* Reading knowledge of one Romance language or permission of instructor.

Russian

LNR 1101 Elementary Russian 1 4 QH
Explores the essentials of grammar, practice in pronunciation, progressive acquisition of a basic vocabulary, idiomatic expressions.

LNR 1102 Elementary Russian 2 4 QH
Continues grammar study; oral and written exercises. *Prereq.* LNR 1101.

LNR 1103 Intermediate Russian 1 4 QH
Offers further knowledge of Russian through oral and written work; the study of grammar, and reading texts of moderate difficulty. *Prereq.* LNR 1102.

LNR 1104 Intermediate Russian 2 4 QH
Continues LNR 1103. *Prereq.* LNR 1103.

LNR 1201 Russian Composition and Conversation 1 4 QH
Offers assistance in developing skills in speaking and writing by means of detailed grammar review and extensive use of audio-visual media. Conducted in Russian. *Prereq.* LNR 1104 or equivalent.

LNR 1202 Russian Composition and Conversation 2 4 QH
Continues LNR 1201 with an increased emphasis on speaking the colloquial Russian idiom. Conducted in Russian. *Prereq.* LNR 1201 or equivalent.

LNR 1205 Stylistics and Advanced Grammar Analysis 1 4 QH
Designed for students pursuing a major or minor in the Russian language; focuses on modern usage of the Russian language through newspaper and magazine articles and short stories. *Prereq.* LNR 1104 or permission of instructor.

LNR 1309 Russian Short Stories of the Nineteenth Century 4 QH
Offers detailed analysis of selected representative short stories read in Russian; study of the development of this genre. *Prereq.* LNR 1104 or equivalent.

LNR 1315 Russian Expository Prose 4 QH
Analyzes lectures, speeches, essays, and critical studies by outstanding Russian scholars. *Prereq.* LNR 1104.

LNR 1316 Russian Folklore 4 QH
Explores various genres of Russian folk literature in Russian. Readings are supplemented with lectures and tape recordings. *Prereq.* LNR 1104.

LNR 1500 Backgrounds in Russian Culture 4 QH
Designed to offer the student a view of Russian culture and civilization; includes guest speakers, films, field trips, and discussions. Conducted in English.

LNR 1510 The Works of Alexander Pushkin in English Translation 4 QH
Offers a survey and analysis in English of Pushkin's artistic prose, lyric poetry, correspondence, friendships, and major literary influences. Conducted in English.

LNR 1511 Russian Literature in English Translation 4 QH
A companion to LNR 1510; provides a survey and analysis in English of some of the works of Tolstoi, Dostoevski, Chekhov, and others. Conducted in English.

LNR 1801, LNR 1802, LNR 1803, LNR 1804, LNR 1805 4 QH each
Directed Study
Directed studies offer students a way of going beyond work given in the regular curriculum and may also serve as a means to complete major or minor requirements in certain situations. Directed studies will not be given in areas adequately covered by existing courses. Priority is given to language majors and to juniors and seniors.

LNR 1820, LNR 1821, LNR 1822, LNR 1823 4 QH each
Junior/Senior Honors Project
For details contact the honors office.

Spanish

LNS 1101 Elementary Spanish 1 4 QH
Presents essentials of correct usage through acquisition of basic skills in reading, writing, speaking, and aural comprehension.

LNS 1102 Elementary Spanish 2 4 QH
Continues language instruction with increasing attention to vocabulary and skills relevant to persons who wish to become involved with the Hispanic world. *Prereq.* LNS 1101 or equivalent.

LNS 1103 Intermediate Spanish 1 4 QH
Includes completion of basic grammatical usage; reading of contemporary Hispanic plays; and oral and written communication based upon assigned readings. *Prereq.* LNS 1102 or equivalent.

LNS 1104 Intermediate Spanish 2 4 QH
Offers intensive reading of current topics, conversation practice utilizing skills acquired in previous coursework, and composition practice based upon varied assigned topics. *Prereq.* LNS 1103 or equivalent.

LNS 1105 Conversational Spanish 1 4 QH
Emphasizes developing the ability to speak and comprehend Spanish. Particularly able students may be accepted after having completed only LNS 1103. In this case, LNS 1105 may be used to satisfy the language requirement. *Prereq.* LNS 1104 or equivalent; open to nonmajors only.

LNS 1106 Conversational Spanish 2 4 QH
Continues LNS 1105, with further emphasis on the development of oral facility in Spanish. Particularly able students may be accepted after having completed only LNS 1104. *Prereq.* LNS 1105 or equivalent; open to nonmajors only.

LNS 1130 Intensive Spanish 8 QH
Encompasses the same material covered in LNS 1101 and LNS 1102. Students with language-learning ability and a commitment to the study of foreign languages are encouraged to take the course. Students are expected to assimilate the material at an accelerated pace. This is a two-sequence course; students must enroll in both sequences. Satisfactory completion of this course enables the student to take LNS 1103.

LNS 1140 Intensive Intermediate Spanish 8 QH
Continues study of Spanish to further audio-lingual skills and improves reading and writing. Seeks to prepare students for advanced Spanish courses. *Prereq.* LNS 1102.

LNS 1201 Spanish Composition and Conversation 1 4 QH
Offers practice in writing and speaking Spanish, including written and oral resumes, prepared speeches and themes, and impromptu speaking and writing. Reviews the more subtle problems of grammar.

LNS 1202 Spanish Composition and Conversation 2 4 QH
Offers further practice in oral and written Spanish; continues study of advanced Spanish grammar. *Prereq.* LNS 1201 or equivalent.

LNS 1203 Advanced Spanish Proficiency 1 4 QH
Covers advanced elements of Spanish syntax, with emphasis upon achieving superior speaking, reading, and writing skills. Designed for those preparing to enter the teaching profession as well as qualified advanced students. *Prereq.* Permission of instructor.

LNS 1204 Advanced Spanish Proficiency 2 4 QH
Continues the aims and goals of LNS 1203. *Prereq.* LNS 1203 and permission of instructor.

LNS 1231 Masterpieces of Spanish Literature 1 4 QH
Traces the development of Spanish literature from the Middle Ages (*las jarchas*, *El poema del Cid*, *El libro de buen amor*, *La Celestina*) through the Renaissance and Baroque periods or Golden Age (Garcilaso de la Vega, the picaresque novel, the mystics, Cervantes, Lope de Vega, Calderon). Conducted in Spanish. (II) *Prereq.* LNS 1104 or equivalent.

- LNS 1232 Masterpieces of Spanish Literature 2** 4 QH
Continues LNS 1231. Surveys the literature of eighteenth-, nineteenth-, and twentieth-century Spain. Includes the literary movements of romanticism, realism, and the generation of '98. Conducted in Spanish. (II) *Prereq.* LNS 1104 or equivalent.
- LNS 1250 History of the Spanish Language** 4 QH
Examines the development and emergence of the Spanish language. Offers the opportunity to become familiar with the language's earlier stages. Emphasizes developing a working knowledge of medieval Spanish. Includes the relationship of old Spanish to Latin, structural characteristics of Old Spanish, and the impact of historical events on language. Compares different stages of Spanish. Conducted in English; however, the textbook is in Spanish. *Prereq.* Reading knowledge of Spanish or permission of instructor.
- LNS 1301 Spanish Medieval Literature** 4 QH
Examines the origins of Spanish Literature from the tenth through the fourteenth centuries. Included among the texts for this class are excerpts from the *jarchas*; the *Poema de Mio Cid*; Berceo's saints' lives; the histories of Alfonso X; *El Conde Lucanor*; *El Libro de Buen Amor*. Also examines non-literary texts such as wills and laws for their historical and literary relevance.
- LNS 1306 Spanish Golden Age Theatre** 4 QH
Examines plays by the outstanding dramatists of the seventeenth century: Lope de Vega, Calderon de la Barca, Tirso de Molina, Ruiz de Alarcon, and others. Conducted in Spanish. *Prereq.* LNS 1232 or equivalent.
- LNS 1309 Spanish Literature of the Nineteenth Century 1** 4 QH
Covers readings in the prose, poetry, and drama of the romantic period, including selections from el Duque de Rivas, Larra, Espronceda, Zorrilla, and Becquer. Conducted in Spanish. *Prereq.* LNS 1232 or equivalent.
- LNS 1310 Spanish Literature of the Nineteenth Century 2** 4 QH
Offers a study of some of the major novelists of the second half of the nineteenth century, such as J. M. de Pereda, Juan Valera, Emilia Pardo Bazan, and B. Perez Galdos. Conducted in Spanish. *Prereq.* LNS 1232 or equivalent.
- LNS 1311 Spanish Literature of the Twentieth Century 1** 4 QH
Examines selections from the writings of the Generation of '98: Unamuno, Valle-Inclan, Pio Baroja, Benavente, Azorin, and the Machado brothers. *Prereq.* LNS 1232 or equivalent.
- LNS 1312 Spanish Literature of the Twentieth Century 2** 4 QH
Focuses on prose and poetry of modern writers, such as Ortega y Gasset, Perez de Ayla, Garcia Lorca, Juan Ramon Jimenez, Gironella, and Jose Cela. *Prereq.* LNS 1232 or equivalent.
- LNS 1315 Latin American Literature 1** 4 QH
Focuses on Latin American literature from the colonial period to the nineteenth century. Students read a variety of short pieces from an anthology, followed by a full-length work. Authors read include Bernal Díaz, Sor Juana, Jorge Isaacs and José Hernández. *Prereq.* LNS 1204 or equivalent.
- LNS 1316 Latin American Literature 2** 4 QH
Focuses on Latin American literature from the late nineteenth century to the contemporary period. Students read a variety of short pieces from an anthology, followed by a full-length work. Authors read include Martí, Borges, Castellanos and Vargas Llosa. *Prereq.* LNS 1204 or equivalent.
- LNS 1400 Spanish Seminar** 4 QH
Focuses upon a narrowly defined theme (that is, a single author, a single work, or a single theme), which students are asked to explore in depth; students are expected to present a final paper based upon individual research. Designed primarily for majors who have progressed to the upper-level literature courses in Spanish. However, nonmajors who show exceptional background may be admitted with the instructor's permission.
- LNS 1401 Seminar in Spanish Literature** 4 QH
Focuses on a selected group of Galdos's novels through detailed discussion and analysis of the novels and collateral readings. An upper-level literature course designed primarily for majors; nonmajors who show exceptional background in Spanish may be admitted. *Prereq.* Permission of instructor.
- LNS 1402 Seminar in the Contemporary Spanish Theatre** 4 QH
Examines a number of dramatists committed to revealing the tragic social and existential aspects of the human condition in contrast to the bourgeois theatre of consumption in Spain. Emphasis is placed on authors such as Vallejo, Sartre, the members of the *generacion realista*, and the "underground" playwrights. Conducted in Spanish. Class participation as well as oral and written projects required. Alternates yearly with LNS 1401. *Prereq.* LNS 1232 or permission of instructor.
- LNS 1405 Topics in Spanish** 4 QH
Provides an in-depth study of specific structural aspects of the Spanish language. Subjects will vary from year to year. *Prereq.* LNS 1102 or equivalent.
- LNS 1500 Backgrounds of Spanish Culture** 4 QH
Examines chronologically the forces which have forged Spanish culture and have made Spain the nation it is today. Traces the development of Spain from the prehistoric caves of Altamira to the present. Observes past and present concerns such as divorce and abortion in a Catholic country, education, the role of women, linguistic diversity, separatism and terrorism, and the incorporation of Spain into the European Community. Incorporates history, sociology, anthropology, geography, economics, and politics. Conducted in English. (IV)
- LNS 1501 Backgrounds of Latin American Culture** 4 QH
Introduces students to Latin American culture through the study of a broad array of literary and critical writings by Latin American authors and selected films from Latin America. Authors read include Sor Juana, García Márquez, and Jorge Amado. Conducted in English. (IV)
- LNS 1506 Cervantes and His Times** 4 QH
Introduces students to *Don Quijote de la Mancha*, Cervantes' major work as well as Spain's greatest masterpiece and its supreme gift to Western culture. Studies Cervantes' minor works, *The Exemplary Novels* and *Interludes*. Examines literary, sociological, philosophical, and historical matters: the development of the novel, genre and narratology, role playing and representation, Spain's triumphs and defeats. Deals with the Spanish Inquisition and censorship and themes such as madness, truth and lying, and appearance and reality. Conducted in English. (III)
- LNS 1510 Saints and Sinners: The Vision of Women in the Middle Ages and the Renaissance** 4 QH
Examines the attainment of and the atonement for love and society's changing attitude toward women as reflected in the literature of the times. Covers selected fabliaux, short stories, poems, and plays

from Boccaccio, Chaucer, Ruiz, Rojas, Machiavelli, Lope de Vega, Calderon, Quevedo, Racine, Middleton, as well as women writers. Reference is made to historical and sociological materials. Conducted in English. All required readings are in translation.

LNS 1511 Introduction to Caribbean Literature 4 QH

Provides a comparative introduction to the modern literary traditions of the Spanish-, English-, and French-speaking Caribbean. Includes authors such as Carpentier (Cuba), Naipaul (Trinidad), Zobel (Martinique), and Cardenal (Nicaragua).

LNS 1512 The Don Juan Figure in Literature 4 QH

Examines the emergence and development of the Don Juan figure in Western literature. Analyzes the character of Don Juan, beginning with his first appearance in the theater of seventeenth-century Spain, and following his development well into the twentieth century. Strives to develop an appreciation and understanding of the character of Don Juan through the centuries, and to analyze the similarities and the differences that may be seen in the character from one cultural milieu to another. Conducted in English; non-English works read in translation. (III)

LNS 1550 Spanish Civil War in Spanish Film 4 QH

Introduces the Spanish film and provides an understanding of the Spanish Civil War (1936–1939). Uses a semiotic approach; studies images of the Spanish Civil War in photographs and posters to show how fictional and historical texts are transferred to the screen. Examines both documentaries and award-winning feature films by prominent Spanish directors. Demonstrates how the realism of the Spanish cinema is combined with surrealist imagery and metaphor to create a distinctive visual style. (III)

LNS 1801, LNS 1802, LNS 1803, LNS 1804, LNS 1805 4 QH each
Directed Study

Offers students a way of going beyond work given in the regular curriculum; may also enable students to complete major or minor requirements in certain situations. Will not be given in areas adequately covered by existing courses. Priority given to language majors and to juniors and seniors.

LNS 1820, LNS 1821, LNS 1822, LNS 1823 4 QH each
Junior/Senior Honors Project

For details contact the honors office.

Music

MUS 1100 Introduction to Music 4 QH

Offers an introduction to selected works of our Western musical heritage, from earliest to contemporary styles. Consists primarily of a survey and listening format, with emphasis on styles, basic theory, forms, and the historical, social, and artistic periods that these works represent. (II)

MUS 1101 Music: A Listening Experience 4 QH

Offers a computer-based "how to listen to classical music" course that assumes no previous musical knowledge. Studies masterworks of Western music but develops listening skills that are globally applicable. Students proceed at their own pace under the guidance and supervision of the instructor. All listening is done at a computer in the Media Center in room 200 Snell Library.

MUS 1103 Music as a Social Expression 4 QH

Examines the processes of music-making and the perceptions of music's functions in our culture. Considers how music is made, what music means, what kind of music is made, and what music is made to be meaningful. Identifies styles and genres of music and examines them within an ever-shifting context of aesthetics, social history, and cultural change. (III)

MUS 1104/AFR 1153 Survey of African-American Musics 4 QH

Explores the various musical traditions of African-Americans, with a specific focus on the United States. Examines the impact of African, European, and Native American traditions on African-American music as well as the role of music as an expression of African-American aesthetics, traditions, and life. Considers historical and contemporary forms of African-American musics, with selected video presentations of musical styles.

MUS 1105 Music of the U.S.A. 4 QH

Examines American music from the time of Puritan psalm singing to the present. Covers a wide variety of music, including concert music, traditional folk music, jazz, and contemporary styles. (V)

MUS 1106 Women in Music 4 QH

Examines the multi-faceted role of women in music from the Renaissance through to the present. Discusses the fact that for centuries women have been active and influential patrons, composers, teachers, conductors, and performers in Europe and America. Examines their contributions to classical and popular music and to jazz, with emphasis on such widely varying figures as Elizabeth Jacquet de la Guerre, Fanny Mendelssohn Hensel, Clara Schumann, Amy Beach, Germaine Tailleferre, Billie Holiday, Carla Bley, Ruth Crawford Seeger, Pauline Oliveros, Sarah Caldwell, Antonia Brico, and Nadia Boulanger.

MUS 1107 Principles of Music Literature 4 QH

Examines the evolution of each major structural element of music through a historical perspective. Also, attempts to link larger categories of music such as classical, popular, and non-Western by examining their common elements. Required of all music majors. *Prereq.* *Permission of instructor.*

MUS 1109 Introduction to Art, Drama, and Music 4 QH

Offers an interdisciplinary approach to music and other arts including painting, film, and theater. Examines works of art from various periods in the context of the cultures that produced them. Supplements regular classes with visits to art museums or attendance at concerts and theatrical performances. (II)

MUS 1110 Music in Popular Culture 4 QH

Deals with the nature of music composed for the mass market. Discusses techniques of recording and merchandising music and selected songs analyzes for their musical content. Traces the evolution of various styles, including ragtime, jazz, blues, rock, and music for the media.

MUS 1111 Rock Music 4 QH

Examines the development of rock'n'roll and its relationship to blues, rhythm and blues, country, folk, and other styles of music. Considers themes such as the role of rock as youth music, the reflections of social realities in rock songs, the relationship of rock to the recording industry and the mass media, and the changing styles of rock. Emphasizes listening skills.

MUS 1112/AFR 1451 Jazz**4 QH**

Examines the evolution of the creative improvisational musical styles commonly called jazz from its African-American roots to its status as one of America's classical musics and an internationally valued art form. Explores the contributions of African and European musical traditions and African-American spirituals, work songs, and blues. Examines major contributors and stylistic development and change through selected audio and audio-visual presentations. Also considers the socio-cultural dynamics that have affected musical evolution and acceptance.

MUS 1120 Topics in Music History**4 QH**

Provides a chronological view of Western music, while examining the role of music in society and exploring the contributions of influential composers. Discusses representative works from each period, including music by composers such as Machaut, Josquin, Bach, Handel, Mozart, Haydn, Beethoven, Berlioz, Wagner, Mahler, and Stravinsky. (III) *Prereq.* MUS 1201.

MUS 1121 Medieval and Renaissance Music**4 QH**

Offers an introduction to European music from the sixth through the sixteenth centuries. Covers a wide variety of music, ranging from the serene elegance of sacred Gregorian chant and the plaintive love songs of the medieval troubadours to the lively dances and humanistic vocal music of the Renaissance. Examines representative works by composers such as Machaut, Landini, Josquin, Palestrina, and Dowland.

MUS 1122 Music of the Baroque Era**4 QH**

Focuses on music of the seventeenth and early eighteenth centuries in Italy, Germany, France, and England. Discusses the emergence of important new genres (such as opera, sonata, and concerto) and examines representative works of major composers (such as Bach, Handel, Corelli, Vivaldi, Rameau, and Purcell).

MUS 1123 Music of the Classical Era**4 QH**

Focuses on crucial developments in musical styles and forms of the late eighteenth century and on emerging genres, such as the symphony, the concerto, and the string quartet. Emphasizes the vocal and instrumental works of Haydn and Mozart and the early works of Beethoven.

MUS 1124 Music of the Romantic Era**4 QH**

Focuses on romantic realism and idealism as expressed in the music of the nineteenth century. Emphasizes historical, nationalistic, and literary influences. Includes composers such as Beethoven, Schumann, Schubert, Berlioz, Liszt, Verdi, Wagner, Brahms, Tchaikovsky, and Mahler. (V)

MUS 1125 Twentieth-Century Music**4 QH**

Focuses on developments in music from 1900 to the present. Examines a broad range of musical styles, including expressionism, neo-classicism, and other major trends in music of the twentieth century. (V)

MUS 1126 New Directions in Music**4 QH**

Recognizes that music from 1950 to the present has changed more radically than during any other era in history. Examines new elements in classical and popular music and focuses on the relationship between the two styles.

MUS 1130 The Symphony**4 QH**

Studies the symphony as a major genre in the classical, romantic, and contemporary periods. Includes works by composers such as Haydn, Mozart, Beethoven, Schumann, Tchaikovsky, Brahms, Sibelius, and Prokofiev.

MUS 1131 Piano Music: The Great Composers and Performers**4 QH**

Gives students the opportunity to hear and analyze some of the greatest works for piano, performed by some of the world's greatest performers. In addition to recordings by internationally acclaimed artists, presents live performances by guest artists from the Boston area.

MUS 1132 Introduction to Opera**4 QH**

Offers an analysis of opera as a dramatic genre. Isolates and discusses aria, recitative, ensemble, and other basic elements of opera. Considers number opera, music drama, and Singspiel types of opera. Includes composers such as Mozart, Wagner, Verdi, and Puccini.

MUS 1133 Great Choral Literature**4 QH**

Analyzes sacred and secular choral literature from medieval to contemporary times.

MUS 1134 Music and Poetry**4 QH**

Examines the art of setting words to music. Confronts the aesthetic problems encountered in a synthesis of two different art forms. Examines that synthesis in selected songs, choral works, tone poems, and operas of diverse periods and styles (classical, folk, and popular). (III)

MUS 1139 Film Music**4 QH**

Surveys the use of music in film and video and gives an overview of the mechanics of synchronization and the psychological implications of applying music to film. Analyzes specific dramatic situations, followed by discussion of such scoring techniques as click tracks and picture recording. Studies films such as *The Informer*, *Alexander Nevsky*, *Citizen Kane*, *Forbidden Planet*, *Woman in the Dunes*, and *Tron*. Discusses the works and careers of specific film composers such as David Raskin, Aaron Copland, Jerry Goldsmith, Sergei Prokofiev, and John Williams.

MUS 1140 Mozart**4 QH**

Traces Mozart's musical development from child prodigy to mature artist through personal letters and biographies. Analyzes many of his major compositions, including symphonies, concertos, operas, and chamber works.

MUS 1144 Debussy and the Music of Paris**4 QH**

Recognizes that Claude Debussy, impressionist in sound, composed music that marked a turning point toward modern trends. Covers much of his music for piano, orchestra, and voice, including *Suite Pour le Piano*, *Suite Bergamasque*, *Images* (for piano and orchestra), *Nocturnes*, *La Mer*, and *Pelleas et Melisande*. Discusses the music of Satie, Ravel, and Fauré as it relates to that of Debussy.

MUS 1145 Beethoven**4 QH**

Analyzes the complex personality and art of Beethoven, his relation to the turbulent times in which he lived, and his role in classical and romantic music. (III)

MUS 1146 George Gershwin**4 QH**

Studies the life and works of George Gershwin (1898-1937), including popular song, musical comedy, opera, and orchestral compositions. Explores the relationship of George Gershwin to his times, both musically and historically. Takes as a critical starting point Gershwin's famous statement, "My people are American; my time is today."

MUS 1161 Music Therapy 1**4 QH**

Examines the application of music as a therapeutic vehicle to release suppressed emotions, to encourage self-expression in psychiatric patients, and to treat a wide variety of disorders. Examines music therapy, in a modern approach to health services, as a supplement to other treatments.

MUS 1162 Music Therapy 2**4 QH**

Examines the etiologies, characteristics, and applications of music therapy with the physically handicapped, hearing impaired, visually impaired, learning disabled, emotionally disturbed, speech/language impaired, and geriatric populations in one-to-one and group settings. In addition, studies improvisations and appropriate music materials for the nonmusician and adapted instrument designs tailored to each disability, while exploring the correlation of music and movement. Compares various musical therapy approaches; includes field trips to musical therapy sites in and around Boston. *Prereq.* MUS 1161.

MUS 1163 Sound Heolth**4 QH**

Gives both musicians and non-musicians the opportunity to experience a heightened awareness of the power of music to effect physical and emotional change. Examines the effects of music on the body, mind, and spirit. Begins with an exploration into the awareness of sound and the physiological changes in the body caused by music, and moves through a variety of theories and techniques used to facilitate positive change, relaxation, and reduction of stress. Also considers sound pollution, the effects of vibrations on the body, guided imagery, music and meditation, and new-age environmental music.

MUS 1165 The Music Industry 1**4 QH**

Examines business-related areas of the music industry. Includes topics such as the make-up and structure of the record industry and music publishing world, the function of performing rights organizations (ASCAP and BMI), and the role of concert and orchestral managers. Includes guests from the various fields who will be invited to lecture in class.

MUS 1166 The Music Industry 2**4 QH**

Continues MUS 1165. Covers such topics as artist management, theatrical production, concert promotion, music merchandising, and royalties and contracts. Requires students to undertake case studies of local musical organizations, both on and off campus. *Prereq.* MUS 1165.

MUS 1167 Music Administration**4 QH**

Introduces music management, including the structure of nonprofit organizations (such as arts service organizations, arts centers, symphony orchestras, chamber orchestras, ensembles, opera companies, and university arts programs) and the structure of profit enterprises. Examines financial management, funding, and audience development. *Prereq.* MUS 1166 or permission of instructor.

MUS 1170 Music and Technology**4 QH**

Studies the applications of contemporary technology to music. Discusses basic acoustics, analog and digital recording techniques, computer sound synthesis, and the aesthetics of electronic music. Requires no prerequisites in physics or music theory; however, takes into consideration the particular backgrounds of individual students for projects and papers. *For non-music majors.*

MUS 1171 Computer Literacy for Musicians**4 QH**

Provides students with training in the use of a computer for numerous music applications including music transcription and notation, sequencing, orchestration, sound design, and computer-assisted instruction. Students undertake various projects in each of these areas to prepare themselves for the computer-related components of courses throughout their music curriculum.

MUS 1172 Introduction to Music Recording**4 QH**

Introduces the history and practice of recording music. Covers recording apparatus; microphones; monophonic, stereophonic, and digital theory and techniques; field recording; studio terminology; basic sound theory; and development of rudimentary editing skills. Also examines the role of the producer versus that of the technician, preparation for recording sessions, and basic legal regulations regarding copyrights and compensation.

MUS 1173 Music Recording 2**4 QH**

Offers the opportunity to learn additional skills in the recording process such as material marketing and distribution, contracts and negotiations, and establishing distribution channels. Includes hands-on studio production of record-quality material. *Prereq.* MUS 1172.

MUS 1174 Music Production for Radio**4 QH**

Introduces the core skills required for production of music programs for radio. Instructs students in technical, contextual, and compositional aspects of music production including transmission chains and signal processing, audience targeting using Modal techniques and music demographics analysis, selecting talent, and structuring a program clock. *This course will be open to music industry majors and music industry minors.*

MUS 1180 Introduction to World Music**4 QH**

Introduces musical traditions from around the world using ethnomusicological approaches to examine the role of music in culture. Focuses on various world musics from the perspectives of the people who create the music and compares these perspectives with our own.

MUS 1181/AFR 1156 Music of Africa**4 QH**

Surveys various African musical traditions with respect to their historical, social, and cultural heritage. Examines traditional and contemporary African musics, instruments, and performance traditions.

MUS 1182 Music of the Middle East**4 QH**

Presents an introduction to the music of selected Near Eastern and Arab cultures (such as Persian in the East and Ethiopic and Berber in Africa). Includes the cantillation styles and practices of various chants of the Hebrew, Christian, and Islamic traditions.

MUS 1183 Music of East Asia**4 QH**

Introduces the student to the musical heritage of East Asia by examining music history, the relationship of music cultures to each other, the organization of musical sounds, and music as an aspect of culture. Emphasizes development of basic listening skills. (IV)

MUS 1184 Musics of South America, Latin America, and the Caribbean 4 QH

Examines the highly diverse and unique musical practices of South America, Latin America, and the Caribbean. Focuses on the traditions of native, African, and European heritage in these geographical areas. Provides exposure to musical repertoires, ideas about music, the relationship of music to culture, musical instruments, musical contexts, and musical syncretism. (IV)

MUS 1185 The Music of the Jewish People 4 QH

Investigates the role that music has played in Jewish life from ancient to modern times. Topics to be studied include: music in the time of *The Bible*, Rabbinic attitudes toward music, music and mysticism, the development of the modes for prayer and scriptural cantillation, church and synagogue music compared, music of the holidays and the life cycle, folk and popular music in the diaspora, the development of art music in the modern era, and music in modern Israel. *Prior knowledge of music is not required.*

MUS 1200 Fundamentals of Music 4 QH

Provides basic instruction for those who want to learn how to read music or how to write a tune. Gives students the opportunity to learn to sight-read music and to compose in some of the basic forms. Students may elect to take MUS 1210 for one extra credit.

MUS 1201 Music Theory 1 4 QH

Continues MUS 1200. Offers the opportunity to improve melodic and rhythmic dictation skills; introduces melodic and harmonic practices to tonal music with additional work in chord and melody construction, leading to the composition of simple four-voice chorales. Students may elect to take MUS 1210 for one extra credit.

MUS 1202 Music Theory 2 4 QH

Continues MUS 1201. Focuses on harmonic practices in tonal music. Examines the role and function of harmony through analysis of musical examples and composition of four-voice chorales. Students may elect to take MUS 1210 for one extra credit. *Prereq. MUS 1201.*

MUS 1203 Music Theory 3 4 QH

Continues MUS 1202 and focuses on aspects of chromatic harmony. Discusses the construction and function of borrowed chords, altered chords, and non-diatonic harmony. Students may elect to take MUS 1210 for one extra credit. *Prereq. MUS 1202.*

MUS 1204 Music Theory 4 4 QH

Introduces the student to methods of musical analysis. Examines phrasing, periodicity, tension-repose, and other structural factors of musical compositions. Students may elect to take MUS 1210 for one extra credit. *Prereq. MUS 1203.*

MUS 1209 Functional Piano 4 QH

Gives students the opportunity to develop the keyboard skills appropriate for an undergraduate concentration in music. Studies realization of a figured bass, the harmonization of a melodic line, simple score reading (including treble, bass, alto, and tenor clefs), transposition, sight-reading, and the ability to play any of the major or minor scales. *Prereq. MUS 1202.*

MUS 1210 Music Theory Lab 1 QH

Provides both group and individual instruction in ear training, sight-singing, and keyboard skills. This lab can be taken only in conjunction with the department's music theory courses (MUS 1201, MUS 1203, MUS 1204). May be repeated for credit.

MUS 1211 Sight-singing 4 QH

Offers students the opportunity to learn how to read music at sight without the aid of a musical instrument, an essential skill for every musician. Emphasizes mastery of the skills of rhythm reading, as well as solfège and triad recognition in all diatonic keys, through class instruction and daily practice. Requires knowledge of the fundamentals of musical notation. *Prereq. MUS 1201 or equivalent.*

MUS 1230 Chorus 1 QH

Allows students to participate as performers in one or more ensembles under the direction of a faculty conductor. May be repeated for credit. *Prereq. Permission of instructor.*

MUS 1231 Band 1 QH

Allows students to participate as performers in one or more ensembles under the direction of a faculty conductor. May be repeated for credit. *Prereq. Permission of instructor.*

MUS 1232 Chamber Ensembles and Orchestra 1 QH

Allows students to participate as performers in one or more ensembles under the direction of a faculty conductor. May be repeated for credit. *Prereq. Permission of instructor.*

MUS 1233 Early Music Players 1 QH

Allows students to participate as performers in one or more ensembles under the direction of a faculty coach. May be repeated for credit. *Prereq. Permission of instructor.*

MUS 1234/AFR 1234 Jazz Ensemble 1 QH

Designed to serve both music majors and nonmajors, this is a performance/theory/history offering of the varied styles and techniques of performance in the jazz tradition of African-American musics. Students are admitted to the course by permission of the instructor following an interview and/or audition. Students are drawn from all segments of the University. Repertory is taken from the standard jazz literature as well as investigations of new works. Improvisational and interpretational technique are the core content of the course. Both the NU Band and the NU Jazz Combo are represented together in this course.

MUS 1241 Piano Class 1 4 QH

Provides introductory-level study of piano designed for students with or without previous experience. Combines skills in reading music with improvisation and functional piano. Introduces some basic theory to help clarify the structure of class repertoire. Allows students to progress at their own pace. Determines grades by the amount of repertoire mastered during the quarter.

MUS 1242 Piano Class 2 4 QH

Continues the skills developed in MUS 1241, with emphasis on increasing students' flexibility at the keyboard through the study of scales, transposition, and modulation. *Prereq. MUS 1241.*

MUS 1244 Voice Class 1 4 QH

Gives students the opportunity to learn the basic vocal production required for fine singing. Chooses repertoire, both classical and contemporary, for each student to learn and perform in lessons and before the entire class. Covers the following subjects: diction, the physiology of singing, resonance, registers, and interpretation. Also studies the basics of music reading and sight-singing. Discusses some interpretation and plays recordings of the greatest vocal artists for class analysis. *Prereq. Permission of instructor.*

MUS 1247 Guitar Class 1**4 QH**

Provides an introduction to the fundamentals of classical guitar playing for those with or without prior knowledge of the guitar. Covers music reading and theory. Requires students to perform alone and in ensemble with other members of the class. Augments the syllabus by live performances from outside professional and student classical guitarists. Bases final grades on several written examinations and student performance.

MUS 1250 Conducting**4 QH**

Provides instruction in the basic gestures used in conducting vocal and instrumental ensembles. Topics include beat patterns, conveying phrasing and articulation, cueing, controlling tempo and dynamics, score study, and rehearsal techniques. Provides an opportunity for students enrolled in the course to constitute a laboratory ensemble for regular practicum. *Prereq. Ability to read music and to sing or play an instrument.*

MUS 1261 Music Lessons**1 QH**

Offers private instruction in voice or in an instrument. Arranges lessons on a half-hour or 45-minute basis. Contact the music department for arrangements. Lab fee. *Prereq. Music majors only and permission of instructor.*

MUS 1265/AFR 1233 Jazz Improvisation 1**4 QH**

Focuses on repertory as well as performance. Examines the great improvisational artists in American music, such as Charlie Parker, Miles Davis, and John Coltrane. Approaches analysis from a theoretical as well as a practical perspective. Explores the use of rhythm, chords, scales, and modes in the creative improvisation process.

MUS 1301 Form and Analysis 1**4 QH**

Examines representative examples of structural principles governing the melodic, harmonic, rhythmic, and formal components of music. Focuses on music from the sixteenth to the mid-nineteenth centuries. *Prereq. MUS 1204.*

MUS 1302 Form and Analysis 2**4 QH**

Continues MUS 1301. Examines works from the late nineteenth century to the present. Includes selected readings by prominent twentieth-century theorists. *Prereq. MUS 1301.*

MUS 1360 Artist Management**4 QH**

Provides an in-depth investigation of the field of musical artist management. Explores the artist-manager relationship, the management contract, artist evaluation, image formulation, the artist's development team, achieving a recording contract, merchandising, endorsements, sponsorships, touring, and financial management. *Prereq. MUS 1166 or permission of instructor.*

MUS 1362 Music Merchandising**4 QH**

Provides a thorough examination of business organization, marketing, distribution, and sales techniques in the diverse field of music merchandising. Investigates market sectors such as musical instruments; professional, semiprofessional, and home audio equipment; the recording industry; and print music. Presents guest speakers from various sectors of the music industry. *Prereq. MUS 1166 or permission of instructor.*

MUS 1365 Seminar in the Music Industry**4 QH**

Offers advanced students the opportunity to explore contemporary events and issues in the music industry. Expects students to apply and distill knowledge accumulated in prior courses. Gives

students the opportunity to develop case studies and engage in actual music industry activities such as producing concerts, managing road tours, promoting records, or planning promotional campaigns for musical merchandise marketing. Offers forums for debate on current controversies and developments in the music industry. *Prereq. MUS 1166 and senior standing.*

MUS 1366 Copyright Law for Musicians**4 QH**

Explores the unique character of music-related copyright issues. Investigates common law copyright; statutory copyright; ownership, duration, and transfer of copyright; fair use; works for hire; infringements and remedies; public domain works; and international copyright. *Prereq. MUS 1166 or permission of instructor.*

MUS 1367 Computer Applications in Music Business**4 QH**

Uses state-of-the-art computer applications in an advanced exploration of the business of music. Investigates computer applications in the record industry, artist management, arts administration, music merchandising, and music publishing. *Prereq. MUS 1166.*

MUS 1421 Historical Traditions 1: American Music**4 QH**

Provides an overview of music in the United States in cultural and stylistic contexts. As the first of a sequence of courses for music majors, introduces historical methods of music. Studies a broad range of styles, including folk, popular, and classical musics. *Prereq. MUS 1107.*

MUS 1422 Historical Traditions 2**4 QH**

Provides an overview of early Western music, from the middle ages through the seventeenth century in cultural and stylistic contexts. Concentrates on classical music, but will also deal with music as a living language, related to other kinds of music and other arts and made by people for different reasons. Uses scores to help understand the different ways music can be written and the different aesthetic definitions of beauty, pleasure, and meaning in sound. *Prereq. MUS 1421.*

MUS 1423 Historical Traditions 3**4 QH**

Provides an overview of eighteenth- and nineteenth-century Western music in cultural and stylistic contexts. Covers some of the best-known figures in classical music: Bach, Mozart, Beethoven, and Wagner. Considers why and how the great tradition of tonal music defines classical music even today. Uses scores to help understand the different ways music can be written and the different aesthetic definitions of beauty, pleasure, and meaning in sound. *Prereq. MUS 1421.*

MUS 1424 Historical Traditions 4**4 QH**

Provides an overview of Western classical music in the twentieth century. Concentrates on classical music but also deals with music as a living language related to other kinds of music and other arts and made by people for different reasons. Focuses on both style, often of one great figure, and topic. Looks for parallels between classical music and the other arts and popular musics as well. *Prereq. MUS 1421.*

MUS 1425 Historical Traditions 5**4 QH**

Examines the historical musical traditions of selected music-cultures of Africa, Asia, Oceania, and indigenous cultures of the Americas. Provides an in-depth study of the evolution of the selected music-cultures focusing on the following considerations: ethnomusicological historical approaches to the study of music-cultures including music and the belief system, aesthetics, context for music, repertoires, organization of musical sound, instruments

and performance techniques, and learning and transmission of musical knowledge (performance and non-performance). Explores why music is different among the world's peoples; what music of the past sounded like, its impact on how music sounds today; what happens to music over time and space; and why music should be preserved and by whom. *Prereq.* MUS 1421.

MUS 1461 Applied Music Lessons 3 QH
Provides advanced individual instruction in voice or on modern and early instruments. May be repeated for credit. Available only to upperclass students concentrating in music literature and performance. *Prereq.* Permission of instructor and department chair.

MUS 1700 Introduction to Music (Honors) 4 QH
Honors equivalent of MUS 1100.

MUS 1709 Introduction to Music and the Arts (Honors) 4 QH
Honors equivalent of MUS 1109.

MUS 1800, MUS 1801, MUS 1802, MUS 1803, MUS 1804, MUS 1805 Directed Study 4 QH each
Focuses independent work in a selected area of music under the direction of one member of the department. Limits enrollment to qualified students by special arrangement with the supervising faculty member and with the approval of the department chair.

MUS 1810, MUS 1811, MUS 1812, MUS 1813 Junior/Senior Honors Project 4 QH each
For details contact the honors office.

Courses at the New England Conservatory
Qualified students will be able to take selected courses at the New England Conservatory of Music. Regular academic credit will be granted. For information, contact the chair of the department.

Philosophy and Religion

PHL 1100 Introduction to Philosophy 4 QH
Introduces students to philosophy by acquainting them with the theories and arguments of classical and contemporary philosophers and by teaching the skills of constructing and analyzing arguments. Emphasizes philosophical inquiry. Covers typical areas such as questions about the basis of morality, free will versus determinism, the existence of God, the problem of suffering, and the nature of knowledge. (II)

PHL 1110 Introduction to Religion 4 QH
Seeks to identify and appraise different ways of being religious: primitive, mystical, dogmatic, and ritual. Emphasizes appreciating the unique standpoint that each requires, how each sees the world in a radically different way, and how that leads to distinctive ways of life. (II)

PHL 1130 Ethics: East and West 4 QH
Explores claims in both Eastern and Western philosophy that a way of life exists that leads to happiness, power, and wisdom. Studies the thought of such philosophers as Socrates, Buddha, Plato, Aristotle, Lao Tzu, Epictetus, Marcus Aurelius, Aquinas, and Spinoza, as well as by studying some of the classical Hindu and Buddhist texts. (V)

PHL 1135 Philosophical Problems of Law and Justice 4 QH
Focuses on two general questions: What is the proper scope of the law? And how should the law be enforced? Under the first question, deals with a number of issues such as whether the law has a legitimate right to restrict such activities as the use of drugs, deviant sexual practices, or gambling. Under the second question deals with the justification of punishment, rehabilitation as an alternative to punishment, and the death penalty. (VI)

PHL 1140 Social and Political Philosophy 4 QH
Focuses on basic questions about the nature of the state and the relationship of individuals to the state. What basis is there for individuals to obey the laws of the state? What conditions must a government meet to be legitimate? What justification can be given for democratic forms of government? What sorts of controls should the state exert over citizens? What benefits do citizens have a right to expect from the state? Includes readings from both classical and contemporary sources. (V) *Prereq.* 4 QH philosophy.

PHL 1160 Philosophical Problems of Economic Justice 4 QH
Focuses on the questions: What is economic justice? And, What features must a society have in order to be economically just? Readings include classical and contemporary works by philosophers and other thinkers. Analyzes and evaluates economic systems such as capitalism, socialism, and the welfare state.

PHL 1165 Moral Problems in Medicine 4 QH
Introduces students to ethical theories, moral principles, and principles of distributive justice. Uses these theories and principles to analyze the moral problems that arise in the medical context. Topics considered are: euthanasia, medical paternalism, informed consent, patient confidentiality, the duty to warn, the right to die and advanced directives, the ethics of medical research, abortion, and human genetics. Also examines the right to health care, distribution of scarce medical resources, and the ethical implications of health maintenance organizations.

PHL 1180 Environmental Ethics 4 QH
Investigates the Gaia hypothesis, the view that the earth is a self-regulating ecosystem. Focuses on a current ecological crisis, the greenhouse effect, and on one of its major causes, deforestation. Addresses the values that underlie our concern over this and other ecological crises, whether the values at issue are anthropocentric or biocentric. Explores the ethical implications these ecological concerns have for our individual lifestyles, and for our role as members of communities. Explores how we should live as creative, responsible, and fulfilled beings on the planet. (VI)

PHL 1200 Introduction to Logic 1* 4 QH
Introduces the logic of propositions and the syllogism. Examines principles of critical reasoning and fallacies. Provides practice in applying logical techniques to the creation and criticism of argument. (II) *Students with a strong math background should enroll in PHL 1215.*

PHL 1203 Introduction to Logic 2* 4 QH
Continues the study of the techniques of logic in the analysis and creation of argument. Explores the logic of predicates, quantifiers, and relations. Provides practice in applying these techniques to natural arguments. Considers the forms of definition and the evaluation of empirical generalizations. (Overlaps PHL 1215.) (II)

*Students should take either PHL 1200 and PHL 1203 or PHL 1200 and PHL 1215. Credit will not be given for all three courses.

PHL 1215/LIN 1215 Symbolic Logic***4 QH**

Focuses on the syntax and semantics of propositional logic and first order quantification theory. Considers relations between these systems and natural language. Covers analysis of the notion of derivation within a system, the notion of logical consequence, and practice in analyzing logical structure in natural language sentences. (II) *Recommended for students with a strong math background.*

PHL 1225 Ancient Philosophy**4 QH**

Examines the philosophy of classical Greece. Considers philosophers with distinctive views of the nature of the material world and of the person, so the course covers both metaphysical and moral writings. Texts are primarily from Socrates, Plato, and Aristotle. Also gives some consideration to early Greek philosophers, to the Sophists, and to later developments.

PHL 1230 Modern Philosophy**4 QH**

Explores the 100 years between 1650 and 1750, sometimes called "the century of genius," a period in which philosophers reacted to the new scientific discoveries of Copernicus, Kepler, and Galileo. Focuses on the development of the rationalist and empirical philosophies during this period, with emphasis on Descartes, Leibniz, Spinoza, Locke, Berkeley, and Hume. (III) *Prereq. 8 QH philosophy.*

PHL 1243 Existentialism**4 QH**

Examines existentialist philosophy in its greatest representatives, such as Kierkegaard, Nietzsche, Dostoevski, Heidegger, Jaspers, and Camus, with major attention given to Jean-Paul Sartre and Maurice Merleau-Ponty. Focuses on central themes, including self-alienation, unauthenticity, authenticity, and existential experiences. Examines existential philosophy in its historical, social, and cultural relations, and in its influence on psychology, psychoanalysis, sociology, political science, and literature, both in Europe and in the United States. *Prereq. 4 QH philosophy.*

PHL 1245 Analytic Philosophy**4 QH**

Traces the development of the analytic movement from its beginnings in the early works of Moore and Russell. Provides some treatment of Russell's logical atomism, the logical positivists, the thought of Ludwig Wittgenstein, and their widespread influence. *Prereq. 8 QH philosophy.*

PHL 1275 Eastern Religions**4 QH**

Explores the fundamental nature of reality. The course first tries to make sense of the difficult notion that the way we perceive reality may be illusory. Examines Theravada Buddhism, a religion that rests on the insights that everything is impermanent and that it is possible to live fully in the present without any suffering. From Theravada Buddhism, the course turns to Mahayana Buddhism, and then to Taoism, a subtle view that emphasizes the "flow" of life and that "the way to do is to be." Next, the Hinduism of the Upanishads is examined. As part of the exploration of this form of Hinduism, students are given the opportunity to examine meditation intellectually and also to practice a few methods of meditation. In addition, the course investigates the devotional aspect of Hinduism as expressed in the Bhagavad Gita. There will also be an exploration of Zen. (IV)

PHL 1280 Islam**4 QH**

Explores the history of Islam, its past and current conflicts with the West, Islamic beliefs, the future of Islam as a world religion, and relations of Islam with Christianity and Judaism. Examines

social, political, and legal issues, as well as with the more familiar religious and theological questions. (IV)

PHL 1285 Introduction to Jewish Religion and Culture**4 QH**

Explores the basic features of Judaism in the ancient, Rabbinic and Modern periods. Employs an historical critical approach to the formative texts and their interpreters. Analyzes Jewish practices within specific historical contexts and discusses the ways in which practices relate to the texts and history of Judaism. Examines the rich varieties of Jewish cultural expressions.

PHL 1290 Cults and Sects**4 QH**

Examines the varieties of religious experience from the perspectives of sociology and psychology of religion. Focuses on such cultic and sectarian groups as Christian Science, the American Shakers, the Unification Church, the Hare Krishna movement, and the Black Muslims. Provides the student the opportunity to acquire critical investigative tools with which to analyze different religious expressions.

PHL 1293 Eastern and Nontraditional Philosophy**4 QH**

Offers a multicultural look, using primary sources, at the diverse perspectives available to address philosophical issues. Perspectives include African, Asian, Latin American, feminist, womanist, Amerindian, and African-American views. Includes such topics as self-identity, reality, truth, knowledge, ethics, social and political arrangements, and perceptions of divinity.

PHL 1315 Understanding the Bible**4 QH**

Introduces students to the Old and New Testaments, so that they can enter into a dialogue with the Bible, understanding not only what it says, but why it is said that way. Focuses on the Bible's social, political, and cultural backgrounds. (III)

PHL 1316 Interpreting the Bible**4 QH**

Offers students the opportunity to understand the Bible as a document that is continually interpreted by believing communities in their own social and religious contexts. Studies various interpretations of such passages as the creation story, resurrection accounts, themes in Revelation, and the Exodus event. *Prereq. PHL 1315.*

PHL 1320 The Meaning of Death**4 QH**

Offers an inquiry into different philosophical and religious perspectives on death and life after death, including an examination of some powerful contemporary accounts of personal confrontation with death, along with investigations into attitudes toward death in other traditions for example, Hinduism and Buddhism. In addition, explores responses to the Holocaust in Europe and theories about life after death (such as those discussed in Raymond Moody's *Life After Life* and Ian Stevenson's *Reincarnation*). (V)

PHL 1335 Moral Philosophy**4 QH**

Explores two basic questions: What sorts of things are good and bad? What actions are right and wrong? Covers major classical conceptions of ancient Greece and Rome, their replacement by the Western religious ethic, its modification and rejection in the early modern period, and the emergence of modern versions of traditional conceptions of the good life, with reflections on the nature of ethical inquiry itself as a legitimate study. *Prereq. 4 QH philosophy or religion or permission of instructor.*

*Students should take either PHL 1200 and PHL 1203 or PHL 1200 and PHL 1215. Credit will not be given for all three courses.

- PHL 1340 Aesthetics** 4 QH
Offers a historical approach to aesthetics, the philosophical analysis of concepts and the solution of problems that arise when one contemplates beautiful (or ugly) objects. Also explores standards of value in judging art by asking the following questions: What features make objects beautiful (or ugly)? Are there aesthetic standards? What is the relation of works of art to nature? What is the nature of an aesthetic experience? *Prereq.* 4 QH *philosophy*.
- PHL 1345 Philosophy of Religion** 4 QH
Asks the basic question, "Does God exist?" Examines several major arguments affirming and criticizing the notion of God's existence. Explores a central problem in recent philosophy of religion of whether or not it makes any sense to speak of the truth (or falsity) of religious belief, as well as the implication an answer to that issue has for religious life. *Prereq.* 4 QH *philosophy*.
- PHL 1350 Philosophy of Human Nature** 4 QH
Considers various attributes of human beings such as intelligence, sexuality, and language in the context of biological, psychological, linguistic, and philosophical views of human nature. Topics and disciplines will change from year to year.
- PHL 1360 Philosophy and Literature** 4 QH
Provides the student the opportunity to learn to recognize, appreciate, and criticize philosophical themes in literature. Includes readings from acknowledged classics by philosophical authors such as Voltaire, Dostoevski, and Sartre; popular contemporary authors such as Vonnegut, Barth, and Pynchon; and readings from more straightforward philosophical sources. Examines the meaning of life, the human condition, depersonalization, alienation, human freedom, questions of value, responsibility, rationality, and personal identity. Explores religious, nihilistic, existential, and other viewpoints.
- PHL 1370 The Meaning of Life** 4 QH
Examines selected philosophical problems of human existence in the contemporary world, with major emphasis on the search for identity and self-fulfillment. Discusses selected problems such as freedom, death, sexuality, alienation, becoming a person, and peak experiences. Includes readings from Kierkegaard, Heidegger, Sartre, Camus, Maslow, Allport, Frankl, Rogers, and Rollo May.
- PHL 1400 Theory of Knowledge** 4 QH
Focuses on questions about the nature and justification of claims to knowledge. Is there genuine knowledge? How do we tell when a belief or theory is sufficiently justified to count as knowledge? Discusses theories such as various forms of rationalism, empiricism, and skepticism. Requires careful reading of works by such influential thinkers as René Descartes, Bertrand Russell, A.J. Ayer, and T.S. Kuhn. *Prereq.* 16 QH *philosophy*.
- PHL 1405 Metaphysics** 4 QH
Considers central problems and theories concerning the nature of reality, with special attention to such areas as the relation between mind and matter, free will and determinism, and criteria of existence. *Prereq.* 8 QH *philosophy*.
- PHL 1410 Philosophy of Science** 4 QH
Focuses on the nature of scientific method, scientific theories, and scientific explanations. Examines the central question of why science is thought to provide the most reliable account of the nature of reality. Considers various theories about the nature and reliability of science. *Prereq.* 4 QH *philosophy*.
- PHL 1415 Advanced Logic** 4 QH
Studies the major results in the meta-theory of first order logic. Examines consistency, completeness, and decidability. Discusses the general notion of an effectively computable process, Church's thesis, and the existence of unsolvable problems. *Prereq.* PHL 1215.
- PHL 1435 Philosophy of Mind** 4 QH
Seeks to show what puzzles and problems result from an honest attempt to answer these questions in a reasonable way: What is the relation between mind and body? Is the mental merely a function of bodily process and behavior, or does it somehow exist "over and above" the material? How are self-knowledge and knowledge of other minds achieved? What is the relation between words and thoughts? Examines classical sources, such as Descartes and Locke, and contemporary sources, such as Wittgenstein and Putnam. Also seeks to arrive at some answers—however tentative or provisional—to these questions. Constantly challenges the student to think and write well about these difficult subjects. *Prereq.* 4 QH *philosophy*.
- PHL 1440/LIN 1440 Philosophy of Language** 4 QH
Examines prospects for a theory of language, its syntax, and its semantics. Examines contrasts between theory of reference and theory of meaning. Asks whether there are universals of language. Analyzes relations between linguistics and psychology. Includes readings from Frege, Quine, Russell, Chomsky, and Fodor. *Prereq.* *Permission of instructor*.
- PHL 1550, PHL 1551, PHL 1552, PHL 1553** 4 QH each
Junior/Senior Honors Project
For details contact the honors office.
- PHL 1700 Introduction to Philosophy (Honors)** 4 QH
Honors equivalent of PHL 1100.
- PHL 1720 The Meaning of Death** 4 QH
Honors equivalent of PHL 1320.
- PHL 1740 Social and Political Philosophy (Honors)** 4 QH
Honors equivalent of PHL 1140.
- PHL 1800 Directed Study** 4 QH
Those interested in the directed study program should meet with the department chair. *Prereq.* *permission of instructor*.
- PHL 1888 Great Philosophers Seminar** 4 QH
Focuses on the writings of a major philosopher. Subjects include Plato, Aquinas, Locke, Hegel, and Heidegger. *Prereq.* 12 QH of *philosophy courses*.
- PHL 1890 Seminar in Religion** 4 QH
Examines topics including theodicy, cosmogeny, contemporary issues in religion, and comparative ethics. *Prereq.* 12 QH of *philosophy and religion courses*.
- PHL 1891 Major Figures in Religious Studies** 4 QH
Focuses on the work of one figure important in the field of religion. Subjects include Augustine, Calvin, Luther, Weber, and Eliade. *Prereq.* 12 QH of *religious studies*.
- PHL 3265 Issues in Medical Ethics** 4 QH
Focuses on issues in medical ethics, especially as they are likely to arise in a clinical setting. Begins with exploration of the two basic systems of ethical theory and then concentrates on their

application in cases exemplifying the issues of euthanasia, paternalism, experimentation, informed consent, quality of life, professional responsibility, right to health care, truth telling, genetic control, abortion, and the allocation of scarce medical resources.

Prereq. Permission of instructor.

Physics

Courses are listed according to level and degree of specialization. General interest courses have no prerequisites and may be used to satisfy College of Arts and Sciences distribution requirements in science. Introductory physics courses are basic first-year physics lecture courses; the corresponding labs are listed under "Introductory Physics Laboratories." Advanced physics and astronomy courses require one year of introductory physics and may be used to satisfy degree requirements for physics majors.

General Interest Courses

PHY 1111 Introduction to Astronomy 1 4 QH
Offers the nonscience student an introduction to modern astronomical ideas. Includes such topics as introduction to the cosmos; tools of the astronomer (atoms, the nature of light and radiation, telescopes, space astronomy); the earth in space; our solar system (origin and future of the solar system, the planets and other bodies, the latest from spacecraft flights, the sun as our bridge to the stars); the question of life in the universe. (II)

PHY 1121 Introduction to Science I 4 QH
Provides for nonscience majors an interdisciplinary treatment of the basic ideas of the natural sciences. Discusses concepts such as energy, gravity, and the atom, followed by a consideration of the ways in which atoms combine to form the substances that comprise matter. (II)

PHY 1132 Energy and the Environment 4 QH
Presents concepts of physics applied to current problems of the physical environment. Topics include sources of energy (fossil fuels, nuclear, and solar); energy storage and conservation; transportation; and pollution of the atmosphere. No previous knowledge of physics is assumed.

Introductory Physics Courses

PHY 1191 Physics for BSET 1 4 QH
Focuses on units and scientific notation, force, Newton's first law, static equilibrium, Newton's second law, momentum, work, kinetic energy, potential energy. *Prereq.* MTH 1191, which may be taken concurrently; BSET majors only.

PHY 1192 Physics for BSET 2 4 QH
Focuses on power, rotational motion, Pascal's law, hydrostatic pressure, molecular mass, ideal gas law, first and second laws of thermodynamics, simple harmonic motion, wave motion, sound, and light. *Prereq.* PHY 1191; MTH 1192, which may be taken concurrently; BSET majors only.

PHY 1193 Physics for BSET 3 4 QH
Focuses on electrostatics, circuit elements, direct current circuits, magnetism, electromagnetic induction, electromagnetic waves, atomic and nuclear physics. *Prereq.* PHY 1192; BSET majors only.

PHY 1201 Physics for the Life Sciences 1 4 QH
Focuses on vector addition of force, principles of statics; Newton's second law, kinetic and potential energy; pressure static properties of fluids, fluid flow. To take the lab for this course, register for PHY 1501 concurrently. (II)

PHY 1202 Physics for the Life Sciences 2 4 QH
Focuses on wave motion, sound, light, optics, static electricity, DC circuits, magnetism. To take the lab for this course, register for PHY 1502 concurrently. (II) *Prereq.* PHY 1201.

PHY 1203 Physics for the Life Sciences 3 4 QH
Focuses on temperature, gas laws, properties of liquids (surface tension and osmotic pressure), properties of solids, thermal physics, Coulomb's law, and atomic and nuclear physics. *Prereq.* PHY 1202.

PHY 1221 Physics for Science and Engineering Students 1 4 QH
The first quarter of a four quarter sequence intended primarily for science and engineering students, covers mechanics, kinematics, dynamics, Newton's laws, work, energy, linear momentum, collisions, and rotations. *Prereq.* MTH 1123 or equivalent, which may be taken concurrently.

PHY 1222 Physics for Science and Engineering Students 2 4 QH
Continues PHY 1221. Focuses on rotation equilibrium, angular momentum, harmonic motion, fluid mechanics, wave motion, sound, and optics. *Prereq.* PHY 1221 and MTH 1124 or equivalent, which may be taken concurrently.

PHY 1223 Physics for Science and Engineering Students 3 4 QH
Focuses on electricity, electric fields, electric potential, Ohm's law, simple circuits, magnetic fields, Faraday's law and induction, and Maxwell's equations. *Prereq.* PHY 1222 and MTH 1125 or equivalent, which may be taken concurrently.

PHY 1224 Physics for Science and Engineering Students 4 4 QH
Focuses on physical optics, special relativity, photoelectric effect, Compton scattering, and quantum mechanics (including the uncertainty principle, the Schroedinger equation, wave functions, the hydrogen atom, solids, nuclear and atomic physics). *Prereq.* PHY 1221, PHY 1222, and PHY 1223 or equivalent.

PHY 1252 Physics Review 1 QH
Offers a calculus-based review for students who have had previous college physics courses not equivalent to the engineering sequence of PHY 1221 through PHY 1224. Covers fundamentals of mechanics, electricity, and magnetism. *Prereq.* One year of college physics and knowledge of elementary calculus.

Introductory Physics Laboratories

PHY 1196 Physics BSET Laboratory 1 1 QH
Covers experiments from various physics topics covered in PHY 1191. Lab fee. *Prereq.* PHY 1191 concurrently; BSET majors only.

PHY 1197 Physics BSET Laboratory 2 1 QH
Covers experiments from various physics topics covered in PHY 1192. Lab fee. *Prereq.* PHY 1196; PHY 1192 concurrently; BSET majors only.

PHY 1198 Physics BSET Laboratory 3 1 QH
Covers experiments from PHY 1193. Lab fee. *Prereq.* PHY 1193 concurrently; BSET majors only.

- PHY 1501 Physics Laboratory for the Life Sciences 1** 1 QH
Accompanies PHY 1201. *Prereq. PHY 1201 concurrently.*
- PHY 1502 Physics Laboratory for the Life Sciences 2** 1 QH
Accompanies PHY 1202. *Prereq. PHY 1501; PHY 1202 or PHY 1203 concurrently.*
- PHY 1521 Physics Laboratory for Science and Engineering Students 1** 1 QH
The first of a two-quarter lab sequence in which the student performs experiments from various fields of physics. *PHY 1221 concurrently.*
- PHY 1522 Physics Laboratory for Science and Engineering Students 2** 1 QH
Continues PHY 1521. *Prereq. PHY 1521; PHY 1222 concurrently.*
- PHY 1533 Physics Laboratory for Science Majors 3** 1 QH
Focuses on lab experiments related to topics covered in PHY 1233. *Prereq. PHY 1522; PHY 1223 concurrently.*

Advanced Physics and Astronomy Courses

- PHY 1302 Electric and Magnetic Fields** 4 QH
Focuses on the basic concepts of electric and magnetic fields, including electric and magnetic fields in free space and materials; Maxwell's equations in integral form. *Prereq. PHY 1301; MTH 1244 concurrently.*
- PHY 1304 Mathematical Physics** 4 QH
Reviews linear algebra and vector calculus, special functions and partial differential equations of physics, potential theory, functions of a complex variable. *Prereq. MTH 1244 and PHY 1233; MTH 1246 concurrently.*
- PHY 1305 Thermodynamics and Kinetic Theory** 4 QH
Focuses on first and second laws of thermodynamics, entropy and equilibrium, thermodynamic potentials, elementary kinetic theory, statistical mechanics and the statistical interpretation of entropy. *Prereq. PHY 1224 or PHY 1233, and MTH 1244.*
- PHY 1401 Classical Mechanics** 4 QH
Covers advanced topics in classical mechanics, including vector kinematics, harmonic oscillator and resonance, generalized coordinates, Lagrange's equations, central forces and the Kepler problem, rigid body motion. *Prereq. PHY 1301 and MTH 1245.*
- PHY 1402 Electricity and Magnetism 1** 4 QH
Covers Maxwell's equations and their experimental basis, electrostatics and magnetostatics, the electromagnetic field in empty space, electromagnetic waves. *Prereq. PHY 1302 and PHY 1304 or equivalent.*
- PHY 1403 Electricity and Magnetism 2** 4 QH
Continues PHY 1402. Focuses on energy and momentum in the electromagnetic field, electrodynamics, the interaction of matter and the field, radiation. *Prereq. PHY 1402 or equivalent.*
- PHY 1404 Wave Motion and Optics** 4 QH
Focuses on harmonic and coupled oscillators, wave equation; geometrical and physical optics; interference, diffraction, optics of solids, amplification of light; and lasers. *Prereq. PHY 1302.*
- PHY 1411 Introduction to Astrophysics and Cosmology** 4 QH
Introduces the student to current ideas in astrophysics and cosmology, with emphasis on recent advances in this field. Focuses

- on tools of the astronomer (gamma-, X-, UV-, optical-, infrared-, radio-telescopes, spectroscopes, spacecrafts, and so on); solar system; stellar properties (site luminosity); stellar spectra; Hertzsprung-Russell diagram; stellar energy sources (gravitational, nuclear); evolution of stars (birth, main sequence, red giants, white dwarfs, planetary nebulae, supernovae, neutron stars and pulsars, black holes and gravitational collapse); methods of interstellar and intergalactic distance measurement; our Milky Way galaxy; extragalactic objects (galaxies, clusters of galaxies, radio galaxies, quasars); cosmology (Olber's paradox, recession of galaxies, big bang theory, cosmic background radiation, formation of galaxies, the future of the universe). *Prereq. Three quarters of elementary physics.*
- PHY 1413 Introduction to Nuclear Physics** 4 QH
Focuses on nuclear structure, nuclear masses, radioactivity, nuclear radiation, interaction of radiation and matter, detectors, fission, nuclear forces, elementary particles. *Prereq. PHY 1303.*
- PHY 1414 Introduction to Solid State Physics** 4 QH
Offers a semiclassical treatment of the thermal, magnetic, and electrical properties of crystalline solids. Examines X-ray diffraction and the reciprocal lattice, elasticity and lattice vibrations, specific heat, properties of insulators, magnetism in insulators and metals, and introduction to the band theory of metals. *Prereq. CHM 1383 or PHY 1303; and PHY 1305 or equivalent.*
- PHY 1415 Quantum Mechanics 1** 4 QH
Focuses on observation of macroscopic and microscopic bodies, the uncertainty principle, wave-particle duality, probability amplitudes, Schrodinger wave theory, and one-dimensional problems. *Prereq. CHM 1383 or PHY 1303; and PHY 1304 or equivalent.*
- PHY 1416 Quantum Mechanics 2** 4 QH
Continues PHY 1415. Covers discrete and continuous states, Schrodinger equation in three dimensions, angular momentum, general theory of quantum mechanics, applications. *Prereq. PHY 1415.*
- PHY 1551 Electronics for Scientists 1** 4 QH
With PHY 1552, forms a two-quarter sequence covering electronic techniques for experimental research in many different fields of science. Focuses on principles of semiconductor devices; analog techniques (amplification, feedback, integration); digital techniques (counting, multiplexing, logic); design of electronic subsystems (analog-to-digital converters, phase-sensitive detectors, data-logging systems); understanding specifications of commercial electronic equipment. In lab examples, makes use of up-to-date integrated and discrete devices such as are currently used in the electronic industry.
- PHY 1552 Electronics for Scientists 2** 4 QH
Continues PHY 1551. *Prereq. PHY 1551.*
- PHY 1555 Wave Laboratory** 4 QH
Offers a general treatment of the problems of mechanical and electromagnetic radiation as wave phenomena. Focuses on the differential wave equation and its application to selected topics; interference and diffraction theory from the standpoint of the Huygens-Fresnel and Kirchhoff formulations; selected experiments in acoustics, optics, and microwaves to illustrate these problems. *Prereq. PHY 1224 or PHY 1302.*
- PHY 1557 Advanced Physics Laboratory** 4 QH
Presents special projects in modern experimental physics, including electronic instrumentation used in measuring physical quantities and use of microprocessors. *Prereq. PHY 1551 and PHY 1552.*

PHY 1561 Project Laboratory 4 QH
Allows students to select and carry out individual projects involving instrumentation and computation. Involves the development of some aspect of instrumentation and/or computation in an ongoing research project and the preparation of a final report. The student will be supervised by the project leader and the course instructor. (Although the course carries 4 QH credit, it is taken in successive winter and spring quarters.) *Prereq. Permission of instructor.*

PHY 1711 Introduction to Astronomy I (Honors) 4 QH
Honors equivalent of PHY 1111.

PHY 1721 Physics 1 4 QH
Honors equivalent of PHY 1221.

PHY 1722 Physics 2 4 QH
Honors equivalent of PHY 1222.

PHY 1723 Physics 3 4 QH
Honors equivalent of PHY 1223.

PHY 1724 Physics 4 4 QH
Honors equivalent of PHY 1224.

PHY 1885, PHY 1886, PHY 1887, PHY 1888 4 QH each
Junior/Senior Honors Project
For details contact the honors office.

Political Science

POL 1110 Introduction to Politics 4 QH
Offers an overview of basic concepts such as power, authority and sovereignty, methods of political analysis, and contemporary political ideologies. Discusses such dynamics as political culture, public opinion and participation, and political systems. (II)

POL 1111 Introduction to American Government 4 QH
Analyzes the American system of government and politics. Includes the philosophical origins and design of the Constitution, public opinion, political behavior and participation, parties and interest groups, and formal governmental institutions. May cover cases in domestic and foreign policymaking. (II)

POL 1112/IAF 1112 Introduction to International Relations 4 QH
Applies basic theories of international relations to examining the foreign policies of the key actors in the international system. Covers topics of international aid, trade, and monetary affairs; issues relating to the arms race, nuclear proliferation, arms control, and disarmament; international law and organizations, human rights, and the impact of technology on the functioning of the international system. (II)

POL 1113/IAF 1113 Introduction to Foreign Governments 4 QH
Presents a comparative study of political organization and behavior in selected countries. Includes such topics as political economy, leadership, political institutions, political culture, and political participation.

POL 1114 The United States Constitution 4 QH
Introduces the U.S. Constitution by exploring its theory, its origin, and the institutions by which it bestows and restrains power. Surveys the constitutional liberties guaranteed. Examines what this fundamental supreme United States law means today, two

centuries after its ratification. Other topics include congressional areas of policy-making responsibility, presidential power, the role of the judiciary in the American system of government, and the reconciliation of majority rule with minority rights.

POL 1260 Public Policy Analysis 4 QH
Uses both theoretical literature and case studies to analyze the structure of and dynamics inherent in the American policymaking process. Introduces such concepts as problem definition, agenda-development, policy formation, implementation, and program evaluation. Examines basic policy analysis methods. (VI)

POL 1261 Public Administration 4 QH
Provides a broad overview of the administrative aspects of public policies and programs. Topics include public management, organizations, budgeting, personnel administration, and program evaluation.

POL 1262 Bureaucracy and Government Organizations 4 QH
Examines the general principles underlying the structures, processes, and operation of public organizations. Looks at the role of bureaucracies within the larger political system, as well as how public agencies develop and change over time.

POL 1266 Public Personnel Administration 4 QH
Presents an overall introduction to the field of public personnel administration. Examines selected topics such as recruitment, selection, classification, case development, equal opportunity, public employee unionism, and collective bargaining.

POL 1267 Politics of Budgeting and Taxation 4 QH
Focuses on the function of budgeting in a variety of governmental contexts, specifically, the appropriations process, the budget as a management tool, and the public policy impacts of the budget. Emphasizes budgeting techniques within this context.

POL 1301 Research Methods 1 4 QH
Offers an introduction to the principal quantitative methods used in political analysis, public administration, political behavior, international relations, and policy sciences. Emphasizes basic statistical techniques, survey methods, and SPSS programming. *Prereq. Middler standing or above, or permission of instructor. Prior completion of college mathematics requirement also necessary.*

POL 1302 Research Methods 2 4 QH
Focuses on methods of quantitative analysis. Covers the following primary statistical topics: significance testing, bivariate regression and correlation, and multiple regression and correlation. In addition, teaches elementary computer skills and the use of a programming language to calculate advanced statistics. Emphasizes the practical application and understanding of statistical techniques by providing numerous examples in the areas of political behavior, public opinion, and public policy analysis. *Prereq. POL 1301 and middler standing or above, or permission of instructor. Prior completion of college mathematics requirement also necessary.*

POL 1303 Political Behavior 4 QH
Examines selected topics in contemporary political science from a political behavior perspective. Focuses on political attitude formation and change, ideology, socialization, public opinion and voting behavior, political campaigning, political violence, and empirical democratic theory.

- POL 1304 Practical Politics** 4 QH
Accentuates and systematically treats some of the problems of organizing for effective citizen action, partisan and nonpartisan, at the grass-roots level. Explores roles in political campaigning.
- POL 1306 Politics in Western Europe** 4 QH
Offers a comparative survey of the societies, economies, and political systems in the democracies of Western Europe. Examines governing structures and major political developments within the major European states, as well as major policy issues (e.g., nationalism, federalism, environmentalism) and issues of European integration within the European Union. (III)
- POL 1308/AFR 1271 The Politics of Poverty** 4 QH
Explores how and why there is poverty, how it affects people's lives, and how it can be eliminated. Examines the relations between poverty, racism, and the economic, political, and administrative systems. Evaluates a number of alternatives and provides an opportunity for clarifying individual assumptions and feelings about poverty.
- POL 1309 International Political Economy** 4 QH
Focuses on international political and economic relations. Examines how nations interact in such areas as trade, finance, and labor relations. Includes such topics as the International Monetary Fund, multinational corporations, economic sanctions, military interventions, technology transfer, and foreign aid. *Prereq.* A course in either economics or international politics is recommended, but not required. (V)
- POL 1310 American Ideology** 4 QH
Analyzes the main American ideologies, including liberalism, neoliberalism, conservatism, neoconservatism, and nationalism. Examines the historic roots of each ideology and its impact on American politics. Explores the ongoing interaction of political ideology and the political process in contemporary American society. (V) *Prereq.* *Middler standing or above, or permission of instructor.*
- POL 1312 Politics and the Mass Media** 4 QH
Analyzes several facets of the mass media: the role of newspapers, radio, and television in public opinion formation; their use and effectiveness in political campaigns; their objectivity and/or bias in reporting the news; their impact on political parties and the distribution of power between Congress and the President.
- POL 1313 International Organizations** 4 QH
Focuses on the development of roles played by international governmental organizations, examining their dual roles as collections of sovereign states and as political actors in their own right. Analyzes the structure and functions of such global organizations as the United Nations as well as regional organizations like the European Union and Organization of American States.
- POL 1314 Interest Groups and Public Policy** 4 QH
Surveys the roles of organized interests in American public policy-making. Examines why groups are formed, how they work, why they succeed or fail, and what cumulative impacts groups have on policy. Spans a variety of groups, from traditional economic interests to social movements, public interest organizations, and professional lobbyists.
- POL 1316 Contemporary Revolutionary Politics** 4 QH
Examines revolution as a political option and revolutionary movements throughout the world today. Examples will be taken from Marxism-Leninism (e.g., Bolshevik Russia, China, Cuba), revolutionary Islam (e.g., Iran, Algeria), and the anti-Communist forces in the former Soviet Union and eastern Europe. Examines the perennial conflict between revolution as an ideal and regime consolidation as a necessity. (VI)
- POL 1317 Law and Society** 4 QH
Examines the sociological understanding of legal phenomena. Places special emphasis on the role of law in promoting cultural and social cohesion in American society.
- POL 1318 State and Local Government** 4 QH
Introduces students to the political and administrative context of state and local government and surveys the structure, function, and politics of states and localities within the context of the United States federal system. *Prereq.* POL 1111.
- POL 1319 Government and Politics of Massachusetts** 4 QH
Emphasizes the political and administrative aspects of government in Massachusetts. Considers the structure and functions of state government as well as major policy problems confronted by public officials. Analyzes the relationship between state and local governments in Massachusetts. *Prereq.* POL 1111.
- POL 1320 Parties and Elections** 4 QH
Analyzes political parties and the American system of elections. Focuses on structural and constitutional biases, the organizational aspects of the parties, mass voting behavior, the impact of elections on public policymaking, and national and state historical trends.
- POL 1322 World Politics** 4 QH
Emphasizes various principles, techniques, and patterns that governments have followed to implement their goals or objectives. Uses a case study approach, with an emphasis on the problems associated with the Middle East analyzed from the United States-Soviet and Arab-Israeli viewpoints.
- POL 1324 Urban Politics** 4 QH
Analyzes the political, administrative, economic, and social dynamics of urban areas from a historical perspective.
- POL 1327 Gender Politics** 4 QH
Explores the relation between what is and what ought to be—and why—in the roles of women in American politics. Examines the traditional roles of women in politics, the suffrage movement, the woman as citizen and voter, the role of sex in achieving power and in political efficacy, and the place of women in “new politics.” Also covers political action to promote women's issues and modern feminism. (VI)
- POL 1329 American Social Welfare Policy** 4 QH
Introduces social welfare policy, with emphasis on programs and services in the contemporary United States. Discusses theoretical frameworks for analyzing social welfare policy; then focuses attention on the substantive areas of welfare, mental health, and social security. Explores various issues and processes related to the design, administration, and implementation of social welfare policy in the context of the American socio-political system.

POL 1331 Science, Technology, and Public Policy**4 QH**

Considers the effects of science and technology on politics and policymaking in America and how politics influences science and technology. Focuses on the differences between scientific and democratic values and definitions of rationality, the nature of public problems, and why some problems are easier to "solve" than others. Particularly looks at such issues as nuclear power, recombinant DNA, abortion, and medical research; addresses the question of who should decide such complex matters. (VI)

POL 1332 Government and Politics of Japan**4 QH**

Focuses on the development of Japan's political system since World War II. Examines Japan's political institutions and practice of democracy in the context of its political culture; the interrelationship between business and government; Japan's foreign policy; and business practices and organization. Raises issues concerning Japan's extraordinary economic success and the limitations of Japan as a model for other countries. (IV) *Not open to freshmen.*

POL 1334 Environmental Policy & Politics**4 QH**

Examines the policy-making processes, historical and socio-economic factors, political forces, governmental institutions, and global trends that shape environmental policy at national and sub-national levels in the United States. Gives attention to a wide range of environmental policy areas, with comparisons made between the United States and other nations.

POL 1335 The American Presidency**4 QH**

Examines the presidential electoral process and the constitutional and extraconstitutional powers of the American President. Studies presidential leadership styles and analyzes the relationship between the executive branch and Congress, the Court, the bureaucracy, and the media.

POL 1336 American Constitutional Law**4 QH**

Employs excerpts of United States Supreme Court decisions and other reading materials to analyze some of the theoretical, structural, and substantive issues inherent in and relevant to the American constitutional system. *Prereq.* POL 1111 and junior or senior standing.

POL 1337 United States Foreign Policy**4 QH**

Examines formulation and conduct of foreign policy and the United States since World War II.

POL 1338 Religion and Politics**4 QH**

Explores the role of religion in domestic and international politics. Examines religion as a source of political tension and strife. Draws examples from the United States and the developing world. Covers Islamic fundamentalism in African and the Near East, Orthodox Jewish parties in Israel, Catholic liberation theology in Latin America, and Protestant fundamentalism and the religious right in America. (V)

POL 1339 Current Political Issues**4 QH**

Analyzes the constitutional and political background of selected contemporary public issues. Primarily for nonpolitical science majors.

POL 1340 Crisis and Change in Central/Eastern Europe**4 QH**

Studies the rejection of communist party rule in the six former Soviet bloc socialist countries, Albania, and Yugoslavia and examines political, economic, social, and international problems of post-communist development. (IV)

POL 1342/AFR 1342 Government and Politics of Africa**4 QH**

Using films, maps, news clips, discussions, and readings, explores contemporary politics in African nations south of the Sahara. Studies South Africa, Nigeria, Kenya, and Ethiopia, among others. Examines apartheid, colonialism, Afro-Marxism, chieftaincy, development, and Pan-Africanism. (VI)

POL 1343 Politics and Violence in Northern Ireland**4 QH**

Analyzes the causes of violence in Northern Ireland. Considers historical, sociological, and economic roots of the conflict, but places major emphasis on politics. Also discusses the international dimension (the roles of southern Ireland, the United States, and so on), paramilitary organizations, legal political parties and groups, and the peace process. Draws comparative parallels, including possible lessons for the United States. (IV)

POL 1345 Government and Politics in the Middle East**4 QH**

Approaches the political, economic, military, and ideological factors within the Arab states and Israel, inter-Arab politics, the Arab-Israeli conflict, and the great power rivalry in the region. (VI)

POL 1346 Gender, Family, and Politics in the Middle East**4 QH**

Surveys the roles that gender and family play in political, economic, and social issues of the Middle East. Focuses on several political systems to provide a view of the diversity and similarity between various governments and societies. Topics include women in development; the connection between family and political power; women and Islam; legal status of women; and women in liberation movements. *Prereq.* POL 1345 or INT 1150/HST 1490 or permission of instructor. (IV)

POL 1347 Russian Politics After Communism**4 QH**

Presents an analysis of the roots of the collapse of the Soviet Union in 1991 and studies problems of political development after communism. Emphasizes the introduction of democracy, the movement toward a market economy, the reorganization of the military, and the control of inter-ethnic strife. (IV)

POL 1348 Russian Foreign Policy**4 QH**

Presents an analysis of the goals, methods, and achievements of Russian policy in the post-Soviet era toward Eastern Europe, Western Europe, the Middle East, Central and East Asia, and the United States, against the background of Soviet behavior toward these areas in the recent past.

POL 1350 American Legislative Process**4 QH**

Explores the structures, dynamics, and styles inherent in public policymaking within the U.S. Congress. Focuses on elections; representation of constituents' interests; the roles played by members, the president, interest groups, and other actors; and how all of this is affected by the structure of Congress and the processes embedded in the legislative body.

POL 1351 Techniques and Practices of Public Management**4 QH**

Focuses on practical skills and techniques of public management. Employs the case method in examining typical management problems at different levels of government. Also covers time and resource management for public sector managerial personnel.

POL 1353 Law and Personal Morality**4 QH**

Examines the use of political power to enforce standards of personal morality and behavior in contemporary American society. Considers such subjects as pornography, sexual privacy and expression, Sunday closing laws, abortion, and prostitution.

- POL 1355 Ethnic Conflict** 4 QH
Analyzes the causes and consequences of ethnic political violence in the contemporary world. Examines selected cases based on their importance and their usefulness for understanding ethnic conflict (such as Bosnia, Canada, Northern Ireland, and states of the former Soviet Union). Considers various policies for preventing and resolving ethnic political violence. (VI)
- POL 1362 Civil Liberties** 4 QH
Uses United States Supreme Court decisions and other reading material to examine the substantive and procedural guarantees of the Bill of Rights and the Fourteenth Amendment and their relation to a liberal democratic society.
- POL 1364 Business and Government Relations** 4 QH
Surveys the relation between economic developments and political processes in the United States. Considers government planning of the economy, monopoly and government regulation, government programs to promote social welfare, and the impact of Federalism on the political-economic system, among other topics.
- POL 1368 Government and Politics of Latin America** 4 QH
Examines the governmental systems, political parties, socio-economic problems, and foreign policies of Latin American states. Focuses on political change. (IV)
- POL 1369 Political Violence** 4 QH
Analyzes political violence in its various contemporary forms (for example, war, revolution, genocide, political terrorism, and military overthrows). Assesses the causes and consequences of political violence (from both practical and moral points of view) and considers strategies for preventing and resolving political violence. (VI)
- POL 1371 Government and Politics of China** 4 QH
Focuses on China's political system during Communist party rule. Addresses fundamental issues that the government has been unable to resolve successfully including leadership recruitment and succession; economic growth; class and class struggle; political culture and the educational system; the nature of socialist democracy and socialist legality; and the appropriate form of socialism for a country wishing to modernize rapidly. Examines the interaction among ideology, development, and culture on these issues. (IV)
- POL 1373 Pre-Modern Political Thought** 4 QH
Presents an analytical and historical examination of the great political thinkers and the main trends of political thought from classical Greece to the Renaissance. (V) *Prereq.* *Middler standing or above.*
- POL 1374 Modern Political Thought** 4 QH
Presents an analytical and historical examination of the great political thinkers and the main trends in political thought from the Renaissance to the twentieth century. (V) *Prereq.* *Middler standing or above.*
- POL 1378 Contemporary Political Thought** 4 QH
Analyzes current ideals, ideologies, and political movements, including existentialism, neo-Marxism, black power, and women's liberation. Also studies the decline of ideology and behavioralism.
- POL 1379 Marx and Marxism** 4 QH
Studies the social and political thought of Karl Marx. Examines the development of Marxian theory after Marx's death. Discusses class struggle, social revolution, and communism. (V)
- POL 1382 Intergovernmental Relations** 4 QH
Analyzes the relationships among national, state, and local levels of government in the United States and the changing patterns of those relationships.
- POL 1384 Arab-Israeli Conflict** 4 QH
Analyzes the effects of the Arab-Israeli confrontation on the internal politics of the Arab states and Israel, Pan-Arab politics, and the role of the great powers in the region. (VI)
- POL 1386 International Law** 4 QH
Focuses on territory and jurisdiction of states, treaties, recognition, peaceful settlement of disputes, resort to force. *Prereq.* *POL 1112.*
- POL 1388 Political Polling and Survey Research** 4 QH
Examines the entire survey research process, which is the most common approach to program evaluation survey design, sampling, questionnaire design, survey administration, data processing, and data analysis. Also involves some statistical analysis. *Prereq.* *POL 1301.*
- POL 1389 American National Security Policy** 4 QH
Traces the evolution of American national security policy in the post-World War II period. Considers American nuclear military policy and conventional non-nuclear military policy. Explores arms control policy.
- POL 1410 Seminar in American Government** 4 QH
Offers an in-depth study of selected topics in American government. *Prereq.* *Senior political science major and permission of instructor.*
- POL 1411 Seminar in International Relations** 4 QH
Offers an in-depth study of selected topics in international relations. *Prereq.* *Senior political science major and permission of instructor.*
- POL 1413 Senior Seminar in Political Science** 4 QH
Offers an in-depth study of selected topics in political science. *Prereq.* *Senior political science major.*
- POL 1415 Seminar in Public Law and Social Issues** 4 QH
Explores the various attempts to give law a satisfactory philosophical foundation and the major critiques of the role of law in modern society. Places special emphasis on the attempt by courts to render justice in various areas of law. The central issue is whether law is a source of objective and determinate, rather than merely personal or political, answers to contentious legal questions. *Prereq.* *Junior or senior standing.*
- POL 1710 Introduction to Politics (Honors)** 4 QH
Honors equivalent of POL 1110.
- POL 1711 Introduction to American Government (Honors)** 4 QH
Honors equivalent of POL 1111.
- POL 1712 Introduction to International Relations (Honors)** 4 QH
Honors equivalent of POL 1112.

POL 1800, POL 1801, POL 1802 Directed Study 4 QH each
Offers independent work on chosen topics under the direction of members of the department. *Prereq.* Junior or senior standing and permission of instructor.

POL 1803 Internship in Politics 4 QH
With department approval, students engage in a political or governmental internship under the supervision of a faculty member. *Prereq.* Junior or senior standing normally required.

POL 1804 Vote Smart Practicum 4 QH
Offers supervised hands-on experience with a nationally recognized non-partisan voters' information resource center. Students are trained on the computer in the use of various databases, engage in assigned research tasks, and assist voters and journalists seeking information on candidates for federal and state office.

POL 1805 Internship in American Government and Politics 4 QH
Students engage in an internship in the Federal government with department approval, under the supervision of a faculty member. *Prereq.* Junior or senior standing usually required.

POL 1815 Internship in State Government 6 QH
Combines state government work experience with academic studies. Students work 15 hours per week in a state government office and attend classes every other week in which work experience and related readings are discussed. *Prereq.* POL 1111 or POL 1318.

Psychology

PSY 1110 Perspectives in Psychology 1 4 QH
Surveys the fundamental principles and issues of the major areas of contemporary scientific psychology. Approaches the study of psychology as a method of inquiry as well as a body of knowledge. Emphasizes biological bases of behavior, principles of learning and motivation, psychological testing, personality dynamics, psychopathology, and therapeutic approaches. *Students who earn credit for PSY 1111 will not earn credit for PSY 1110. (II)*

PSY 1111 Foundations of Psychology 1 4 QH
Surveys the fundamental principles and issues of the major areas of contemporary scientific psychology. Approaches the study of psychology as a method of inquiry as well as a body of knowledge. Emphasizes biological bases of behavior, principles of learning and motivation, psychological testing, personality dynamics, psychopathology, and therapeutic approaches. Requires research participation in psychology experiments (or alternative). *Students who earn credit for PSY 1110 will not earn credit for PSY 1111.*

PSY 1112 Foundations of Psychology 2 4 QH
Continues PSY 1111, emphasizing the areas of lifespan development, sensory and perceptual processes, states of consciousness, cognition, language, memory, emotion, and social influences on behavior. Requires research participation in psychology experiments (or alternative). (Overlaps PSY 1113.) *Prereq.* PSY 1110 or PSY 1111.

PSY 1113 Perspectives in Psychology 2 4 QH
Continues PSY 1110, emphasizing the areas of lifespan development, sensory and perceptual processes, states of consciousness, cognition, language, memory, emotion, and social influences on behavior. (Overlaps PSY 1112.) (II) *Prereq.* PSY 1110 or PSY 1111.

PSY 1210 Research Methods in Psychology 4 QH
Introduces research methods in psychology such as field research, content analysis, case research, survey methods, simulations, and laboratory experiments. Examines issues of research fairness and evaluating research methods. Explores basic statistical notions including sampling, variability, and correlation. *Prereq.* PSY 1112 or PSY 1113.

PSY 1211 Statistics in Behavioral Science 1 4 QH
Introduces descriptive statistics (scales of measurement, frequency distribution and graphs, measures of central tendency, dispersion and correlation, standard scores, and the unit normal curve) and probability theory (permutations, combinations, and the binomial theorem). *Prereq.* MTH 1101 or MTH 1107, and PSY 1112.

PSY 1212 Statistics in Behavioral Science 2 4 QH
Offers a general presentation of hypothesis testing, including parametric and nonparametric tests, with emphasis on formulating hypotheses and choosing appropriate scales of measurement, tests, and confidence levels. *Prereq.* PSY 1211.

PSY 1215 Sexual Behavior 4 QH
Focuses on the sexual activities of the human male and female from infancy to adulthood. Considers the importance of sexual factors in the life history of the individual, statistical surveys of sexual behavior, and direct observational measures of sexual responding. Explores the nature of love, responses to pornography, prostitution, bisexuality, male and female homosexuality, rape, child abuse, and sexual therapy.

PSY 1216 Researching Consciousness 4 QH
Introduces the varied scientific approaches to the study of consciousness and the diverse theories of consciousness and the mind. Explores biology and consciousness; drug-induced states of consciousness, dreaming; hypnosis, meditative states, pain perceptions, animal minds, and anomalous psychology (e.g., near-death experiences and ESP). Examines data, theory, and methodological and conceptual problems.

PSY 1218 Psychology of Women 4 QH
Introduces the student with little or no background in psychology to the current theories and research on the psychology of women. Critically examines psychological, biological, and social influences on gender differences, gender roles, and gender stereotypes in the light of scientific evidence and individual experience. Assesses their consequences for society. Uses the unique perspective generated in the field of the psychology of women to evaluate traditional research methods in psychology as well as the major psychological theories formulated to explain women and the differences between women and men. Emphasizes critical-thinking skills.

PSY 1220 Biological Basis of Mental Illness 4 QH
Examines current hypotheses of brain dysfunction involved in mental illness. Explores the field of biological psychiatry including events in the brain that can be linked to mental disorder. Studies current neurochemical and genetic theories of diseases such as schizophrenia and depression. Emphasizes recent research and critically assesses treating mental disorders biologically, such as with drug therapy.

PSY 1231 Learning and Motivation 1 4 QH
Offers an introduction to the basic learning and motivational principles that permit humans and animals to adapt effectively to a changing environment. Emphasizes research and theories of

operant and Pavlovian conditioning, with discussions of discriminations and generalization, avoidance and punishment, acquired motivational states (for example, addiction), concept formation, biological constraints on learning and behavior, animal cognition, and other related topics. Relates learning and motivational principles to the understanding and treatment of behavioral, affective, cognitive, and motivational disorders. *Prereq.* PSY 1112 or PSY 1113.

PSY 1241 Developmental Psychology 4 QH
Examines changes in social relationships, moral reasoning, language, cognition, sensation and perception, personality, and sex roles that occur with development from infancy through adolescence. Examines major theories of development regarding the role of biology, social learning, and peer and parental influences. Explores individual differences (in attachment and temperament, for example) and research issues relevant to the study of children. *Prereq.* PSY 1112 or PSY 1113.

PSY 1242 Adult Development and Aging 4 QH
Examines theories of adult personality development and views on the stability of personality over time. Explores changes from young adulthood onward in sexuality, heterosexual relationships, friendships, and occupational roles as well as age-related differences in learning, memory, intelligence, and physical functioning. Attention is also given to issues surrounding family violence, age-related changes in mental health and suicide rates, death and dying, ageism, and intergenerational relations. *Prereq.* PSY 1112 or PSY 1113.

PSY 1243 Infant Development 4 QH
Focuses on the fact that during the first two years of life, the basic physical perceptual, cognitive and emotional capacities emerge and interact in the development of such complex behaviors as visually guided movement, the formation of social attachments, and the emergence of language. Provides an introduction to this critical period of human development; emphasizes how the infant's biological inheritance interacts with the physical and social environment in the generation of these important abilities and behaviors. *Prereq.* PSY 1241 or ED 1102.

PSY 1244 Childhood Mental Illness and Mental Retardation 4 QH
Focuses on mental illnesses that are first diagnosed in childhood such as autism, phobias, conduct disorders, and attention-deficit disorder. Overviews childhood depression and suicide and disorders of eating and sleeping. Covers etiological factors in mental retardation (e.g., maternal disease, lead poisoning, chromosome abnormalities). Describes personality characteristics of individuals with mental retardation as well as the effects of institutionalization, mainstreaming, and psychological interventions. *Prereq.* PSY 1112.

PSY 1251 Food, Behavior, and Eating Disorders 4 QH
Investigates what starts and stops eating behavior. Examines taste, nutrition, metabolism, the brain, food experiences, and societal factors that control feeding behavior. Emphasizes the biological/psychological interaction in normal eating and in pathological eating, such as anorexia, bulimia, and extreme obesity.

PSY 1262 Psychology of Language 4 QH
Provides a basic introduction to psycholinguistics. Topics include the nature and structure of languages, processes involved in the production and comprehension of language, the biological bases of language, and aspects of language acquisition. Examines current theories of language processing and related experimental findings. *Prereq.* PSY 1112 or PSY 1113.

PSY 1263 Nonverbal Communication 4 QH
Examines the messages we send by posture, facial expression, voice quality, gestures, touch, gaze, and interpersonal distance. Examines origins and consequences of these behaviors as well as differences related to culture, personality, power, gender, and age. *Prereq.* PSY 1112 or PSY 1113.

PSY 1271 Social Psychology 4 QH
Provides an introductory survey of social psychology. Focuses on aggression, attribution, attitude formation, change, measurement, conformity, impression formation, and group processes (social facilitation, deindividuation, for example). *Prereq.* PSY 1112, PSY 1113, or permission of instructor.

PSY 1272 Personality 1 4 QH
Offers a systematic study of the normal personality and its development. Focuses on behavioral, dynamic, and constitutional determinants, assessment of personality, research; surveys the major theories of personality. *Prereq.* PSY 1112 or PSY 1113.

PSY 1273 Personality 2 4 QH
Continues PSY 1272. *Prereq.* PSY 1272.

PSY 1274 Psychology and the Law 4 QH
Traces the effects of psychological factors through the course of a trial, including such issues as accuracy of eyewitness identification, plea bargaining, jury selection, persuasion tactics in the courtroom, presumption of innocence, jury size, jury decision rules, and sentencing and punishment.

PSY 1280 Black Psychological Identity 4 QH
Provides an interdisciplinary look at the social, political, and psychological factors shaping contemporary African-American identity. Explores several different factors that interact with blackness to shape the diversity of African-American experience, such as skin color, gender, culture, and class. Studies black identity as it has been conceptualized, measured, and researched by psychologists. Readings include essays written by important African-American thinkers, fiction and autobiographical narratives, as well as empirical research in the field of psychology. This course is the same as AFR 1280.

PSY 1351 Psychobiology 4 QH
Focuses on the relation between brain function and human behavior. Examines how nerve cells function individually and work together both in small networks and in the nervous system; the structure of the nervous system; how our sense organs provide the nervous system with information about the outside world; how the brain controls movement; and how psychological concepts from motivation to language and memory are represented in the brain. *Prereq.* PSY 1112, PSY 1113, or permission of instructor.

PSY 1353 Animal Behavior 4 QH
Surveys animal behavior in a wide range of species (reptiles, birds, fish, and mammals, including humans) to find similarities and differences in the behavioral processes and physiological

mechanisms by which individual organisms and species adapt to their environments. The first section focuses on adaptive specializations exhibited by animals in learning about their environments during early development and as adults. The second section examines problems of social organizations at the individual level: how animals communicate with each other and transmit "cultural" skills; mechanisms underlying cohesion and dispersal (for example, reproduction and aggression); and the adaptive advantages of being social or asocial. The final section provides students with an unusual opportunity to apply concepts and experimental methods they have learned by actually doing a short field study of animal behavior at the Boston Zoological Park. *Prereq.* PSY 1112, PSY 1113, or permission of instructor.

PSY 1362/LIN 1362 Child Language 4 QH

Examines how language develops in children. *Prereq.* LIN 1118, PSY 1262, or permission of instructor.

PSY 1364 Cognition 4 QH

Provides a basic introduction to human cognition. Topics include pattern recognition, attention, memory, categorization and concept formation, problem solving, and aspects of cognitive development. Examines current theories of cognitive processing and related experimental findings. *Prereq.* PSY 1112 or PSY 1113.

PSY 1365 Language and the Brain 4 QH

Focuses on linguistic behavior from a neuro-psychological viewpoint. Examines models of how the nervous system, and the brain in particular, controls the production, perception, and internal manipulation of language. Considers localization of cerebral functions and hemispheric lateralization; experimental and clinical evidence for functional models; aphasia and other language pathologies; schizophrenic language; evidence from "slips of the tongue"; and the bilingual brain. Compares speech, sign language, and writing systems. Also discusses interpretation and translation. *Prereq.* PSY 1262 or permission of instructor.

PSY 1371 Industrial/Organizational Psychology 4 QH

Surveys the psychological fundamentals underlying performance in work settings. Topics include psychological testing, performance evaluation, training, motivating, and leading employees, and the social psychology of organizations. Emphasizes ethical and affirmative action issues. *Prereq.* PSY 1271 and PSY 1211.

PSY 1373 Abnormal Psychology I 4 QH

Surveys the abnormal personality, including systems of diagnoses, defense mechanisms, and criteria of psychopathology. Examines the symptomatology, etiology, and dynamics of anxiety disorders (phobia, obsessions, compulsions, etc.), dissociative disorders (amnesia, multiple personality, etc.), and somatoform disorders. Examines case histories in detail. *Prereq.* PSY 1112 or PSY 1113.

PSY 1374 Abnormal Psychology 2 4 QH

Surveys psychological and somatic therapies. Examines the symptomatology, etiology, dynamics, and therapy of schizophrenia, paranoid disorders, mania, depression, and organic disorders. *Prereq.* PSY 1373.

PSY 1381 Sensation 4 QH

Provides an introduction to the study of our senses, with emphasis on hearing, touch, taste, and smell. Focuses on how we measure our sensory abilities and relates findings to the functioning of sensory organs—ears, skin, mouth, and nose—and of the sensory nervous system. *Prereq.* PSY 1112 or PSY 1113; PSY 1351 is highly recommended.

PSY 1382 Perception 4 QH

Offers a study of our awareness of the world around us, exemplified primarily by visual perception. Covers light, visual sensory mechanisms, color vision, illusions, consciousness, and dreams. *Prereq.* PSY 1112 or PSY 1113; PSY 1351 is highly recommended.

PSY 1410 Systems and Theories of Psychology 4 QH

Presents in an historical context the core ideas and theoretical positions encountered by students in previous courses. Examines different systematic orientations such as structuralist, functionalist, Gestalt, psychoanalytic, behaviorist, cognitive, and humanistic psychology to demonstrate the extent to which the systems influence contemporary American psychology. *Prereq.* Junior or senior status in psychology major or permission of instructor.

PSY 1431 Behavior Therapies 4 QH

Offers a study of successful projects that have provided effective remediation and rehabilitation in institutions for the mentally ill, the mentally retarded, and the developing human (schools). *Prereq.* PSY 1231 or permission of instructor.

PSY 1442 Human Memory 4 QH

Offers a detailed examination of how people learn and remember. Examines the different kinds of memory, short-term, episodic, and semantic, with emphasis on current theories of memory function and related experimental findings. *Prereq.* PSY 1364 or PSY 1262.

PSY 1451 Psychopharmacology 4 QH

Examines interactions between drugs, brain, and behavior. Focuses on such topics as synaptic transmission, behavioral functions of specific neurotransmitter systems, pharmacological treatment of mental and neurological disorders, and drug abuse. *Prereq.* PSY 1351 or equiv. with permission of instructor.

PSY 1499 Psychology of Reading 4 QH

Provides an overview of issues in the psychology of reading. Topics include the nature of the reading process as a cognitive activity, eye movement patterns in reading, stages of reading development, and dyslexia. Examines current theories of reading and text comprehension. *Prereq.* PSY 1262 or PSY 1364.

Directed Studies — Honors Courses

PSY 1710 Perspectives in Psychology 1 (Honors) 4 QH

Honors equivalent of PSY 1110. (II)

PSY 1713 Perspectives in Psychology 2 (Honors) 4 QH

Honors equivalent of PSY 1113.

PSY 1770 Honors Directed Study 4 QH

For details contact the undergraduate coordinator in the psychology department, 125 Nightingale Hall.

PSY 1890, PSY 1891, PSY 1892, PSY 1893, PSY 1894 Directed Study 4 QH each

Offers independent work under the direction of the psychology department, usually in a research project in one of the department labs. Faculty members normally require completion of advanced lab courses in the area of research interest, but this is a matter of individual discussion. Students interested in directed study should consult a departmental adviser. *Prereq.* Permission of instructor.

PSY 1895, PSY 1896, PSY 1897, PSY 1898**4 QH each****Junior/Senior Honors Program**

For details contact the honors office.

Laboratories**PSY 1511 Experimental Design in Psychology****4 QH**

Focuses on the experimental method in the design, execution, analysis, and reporting of psychological investigations of humans and animals. *Prereq.* PSY 1112 or PSY 1113 and PSY 1212.

PSY 1530 Experiments in Learning and Motivation**4 QH**

Gives students the opportunity to assess the generality, specificity, and robustness of learning and motivational principles primarily through field experiments with free-ranging feral animals. Involves designing and conducting experiments and writing reports on operant and Pavlovian conditioning, adjunctive behavior, biofeedback, and related topics. Focuses on the theoretical and clinical implications of experimental findings. This course does not use laboratory animals. *Prereq.* PSY 1231 and PSY 1211.

PSY 1531 Learning and Motivation Laboratory**4 QH**

Gives students the opportunity to gain proficiency, through direct experience, in lab analysis of behavior and in evaluating common generalizations about human behavior. Expects students to design and perform experiments in animal and human learning, memory, decision processes, concept formation, and other topics of individual interest. *Prereq.* PSY 1212 and PSY 1231.

PSY 1551 Laboratory in Psychobiology**4 QH**

Introduces the methods of research in psychobiology. Expects students to work in small groups, conducting three to four hands-on laboratory exercises under supervised conditions. Expects students to read selections of the relevant scientific literature, analyze the collected data, and write experimental reports. *Prereq.* PSY 1351 or permission of instructor.

PSY 1562 Psycholinguistics Laboratory**4 QH**

Provides students the opportunity to acquire first-hand experience in conducting research on issues in the psychology of language. Focuses on classical experiments and their implications for broader issues of language processing. Involves students in all aspects of each experiment, including collecting and analyzing data and preparing lab reports. *Prereq.* PSY 1212 and PSY 1262 or PSY 1364.

PSY 1564 Cognition Laboratory**4 QH**

Provides students the opportunity to acquire first-hand experience in conducting research on issues in human cognition. Focuses on classical experiments and their implications for broader issues of cognitive functioning. Involves students in all aspects of each experiment, including collecting and analyzing data and preparing lab reports. *Prereq.* PSY 1212 and PSY 1364 or PSY 1262.

PSY 1571 Laboratory in Social Psychology**4 QH**

Provides an introduction to the methods of social-psychological research. Assists students in developing the ability to read published social research with a critical eye, to pose questions in a testable manner, to apply experimental methods to social research, and to express themselves in APA journal style. *Prereq.* PSY 1212 and PSY 1271.

PSY 1572 Personality Laboratory**4 QH**

Provides an introduction to the methods and areas of personality

research. Discusses problems of measurement, control, and interpretation. Critically examines representative published experiments. Expects students to design, collect data for, assess, and write up several experiments, including one original research project. *Prereq.* PSY 1212 and PSY 1272.

PSY 1575/AFR 1575 Community Psychology Laboratory**4 QH**

Teaches critical thinking about the relationship between social problems and social psychological constructs. Gives students the opportunity to conduct field studies investigating the impact of a current social problem on community residents. Involves students in all aspects of survey research, including operationalization of key variables, development of survey instruments, data collection through interviews or telephone surveys, and the statistical analysis and interpretation of data. *Prereq.* PSY 1271 or PSY/AFR 1280 or AFR 1100 and PSY 1211.

PSY 1581 Sensation and Perception Laboratory**4 QH**

Focuses on experiments involving precise measurements of both physical and psychophysical phenomena, including auditory function, color vision and after-effects, muscular sensation, tactile sensitivity, and adaptation to perceptual distortions. *Prereq.* PSY 1212 and PSY 1381 or PSY 1382.

Seminars**PSY 1610 Psychological Research and Personal Values****4 QH**

Examines ethical concerns and values in designing and applying research, in setting research goals, and in using research subjects. Develops strategies for reflecting on ethical concerns from historical, psychological, philosophical, sociological, and spiritual perspectives, and for putting personal values into action through innovation, advocacy, career decisions, etc. *Prereq.* Any laboratory course in psychology and research or co-op experience in psychology.

PSY 1614 Seminar on Heredity and Society**4 QH**

Focuses on the origins of the intelligence testing movement and the movement's relation to eugenics and to behavior genetics. Studies history, methods, substantive findings, and social implications of psychological measurement and testing. Examines the extensive research literature on intelligence testing and the nature/nurture problem in areas such as psychopathology, criminality, and alcoholism. *Prereq.* Permission of instructor.

PSY 1632 Seminar in Behavior Modification**4 QH**

Discusses topics in behavior modification in a seminar format. *Prereq.* PSY 1231, PSY 1531, or permission of instructor.

PSY 1651 Seminar in Psychobiology**4 QH**

Offers intensive study, discussion, and practice in lab studies of physiological variables. Covers evolution of the nervous system, sensory and motor mechanisms, motivation and emotion, sleep, attention and perception, learning, and memory. *Prereq.* PSY 1351 or permission of instructor.

PSY 1661 Seminar in Psycholinguistics**4 QH**

Offers intensive study and discussion of issues in the psychology of language. Specific topics vary by quarter. *Prereq.* PSY 1212 and PSY 1262 or PSY 1364.

PSY 1662 Seminar in Cognition**4 QH**

Offers intensive study and discussion of issues in cognitive psychology. Specific topics vary by quarter. *Prereq.* PSY 1212 and PSY 1262 or PSY 1364.

PSY 1671 Seminar in Social Psychology**4 QH**

Expects students to examine and present in class their findings on a particular topic in social psychology, such as attribution, aggression, conformity, attitude-behavior relationship. *Prereq.* PSY 1271 or permission of instructor.

PSY 1672 Seminar in Clinical Psychology and Personality**4 QH**

Offers seminar presentations of topics relevant to understanding the normal and disturbed personality. Covers topics such as specialized assessment procedures, cognitive styles in personality, temperament, hypnosis, anxiety, aggression, specialized clinical syndromes, and the development of conscience. *Prereq.* PSY 1373 or permission of instructor.

PSY 1681 Seminar in Sensation and Perception**4 QH**

Expects students to present in class their finding on topics such as how perceptions are organized, formed, and modified by sensory, attentional, motivational, and cognitive factors, how our sensory systems extract information from the environment in a consistent and lawful manner, despite large changes in environmental conditions, and how to account for this in physiological terms. *Prereq.* PSY 1351 and PSY 1381 or PSY 1382.

Note: PSY 1410, *Systems and Theories of Psychology*, also counts as a seminar.

Sociology

SOC 1100 Introduction to Sociology**4 QH**

Explores basic concepts and theories concerning the relation between individuals and society. Emphasizes the influence of culture, social structure, and institutions in explaining human activity. Discusses and analyzes social groups, socialization, community, class, power, and social change, among other substantive issues.

SOC 1101 The Sociology of Everyday Life**4 QH**

Examines the development, application, and consequences of rules for everyday activities (for example, walking, talking, eating, drinking, sitting, smoking, laughing, crying, and sleeping). Considers the effects of artifacts, culture, space, and territory on these activities, on social life, and on the expression of emotions.

SOC 1102 Social Inequality and Communication**4 QH**

Analyzes the ways in which groups and institutions, in both their ritual and everyday activities, communicate the idea of hierarchy and an individual's place in it through face-to-face interaction, formal communication, and the use of space and time. Takes a dramaturgical approach to social organization, with special emphasis on status images in the media and the communication of social place by service organizations and professional groups. Includes some content analysis and observational fieldwork.

SOC 1103 American Society**4 QH**

Focuses on American society, culture, and major social institutions: economic, religious, governmental, familial, educational, welfare, and recreational. Examines social classes and stratification, mobility, and individualism. *Prereq.* SOC 1100 or equivalent.

SOC 1104 Contemporary Japanese Culture and Society**4 QH**

Focuses on contemporary Japanese urban society. Examines major values, family structure, sex roles, social control, the economy and the division of labor, mass media, religion, arts, and social problems. (IV)

SOC 1105 Society and Culture in Russia and the Former Soviet Union**4 QH**

Focuses on contemporary Russian society. Emphasizes the social, economic, and political reforms of the Gorbachev period and the ways in which the Soviet Union has evolved since 1917 and in the post-Soviet period. (IV)

SOC 1120 Sociology of Boston**4 QH**

Examines Boston from the perspectives of environmental development, neighborhood and intergroup relations, institutional services, and symbolic meanings. Explores current issues in the city through term projects. Requires field trips.

SOC 1121 Doing Sociology**4 QH**

Takes a research approach to sociology. Focuses on students' participation in their own learning about sociology as a body of knowledge and as a method of studying social life. Requires students to use the computer during the course. (II)

SOC 1125 Social Problems**4 QH**

Analyzes in both empirical and theoretical terms many of the social problems currently facing Americans. Focuses on the deepening inequality and poverty among working and middle-class Americans, particularly racial minorities, women, and youth; related problems of racism and sexism; the disintegration of the family; growing unemployment; the international ecological crisis; the deterioration of the health system; crime; war and militarism; and strategies and political options for solving these problems.

SOC 1135 Social Psychology**4 QH**

Examines the effects of social interaction on individual behavior. Surveys major theoretical orientations and substantive topics such as presentation of self, effect of television, conformity in fads, gossip and rumor, mass and serial murder, and bystander apathy.

SOC 1140 Sociology of Prejudice and Violence**4 QH**

Examines factors in the development and maintenance of prejudice and discrimination. Discusses American race relations, anti-Semitism, sex roles, and stereotyping.

SOC 1146 Environment and Society**4 QH**

Examines the political economy of the global environmental crisis. Topics vary from quarter to quarter and include such issues as world resource availability, energy, pollution, ecological degradation in the Third World, environmental policy, and social movements. Involves practical experience in environmental problem solving. (VI)

SOC 1147 Urban Social Problems**4 QH**

Focuses on the foundations of urban life in historical perspective. Analyzes relation of city life to environment, population, social organization, technology and cultural values. Examines growth trends, urbanization, urban planning, and citizen action.

SOC 1150 Introduction to Women's Studies: Image, Myth, and Reality**4 QH**

See INT 1150 for course description.

SOC 1155 Sociology of the Family**4 QH**

Focuses on the family as a social institution in several selected cultures; interrelations of the family and political, economic, and educational institutions; social nature of personality; role taking; individualism, mobility, and industrialism. (V)

SOC 1156 Violence in the Family**4 QH**

Examines physical, emotional, and sexual violence in families, with emphasis on child, sexual, and spouse abuse. Covers defini-

tions, prevalence, causes, prevention, and treatment of specific cases of domestic violence. Focuses on social policy issues and problems of legal intervention in cultural and family issues.

SOC 1160 Gender in a Changing Society 4 QH

Considers why and how gender is constructed in American society, and looks at different theories of gender. Includes topics such as the expression of gender in everyday life; its development in childhood; its centrality in the traditional family, the workplace, and sexuality; and its role in violence against women.

SOC 1165 Students, Schools, and Society 4 QH

Emphasizes the role of education in processes of socialization, social mobility, social control, and social change. Do social characteristics (sex, race, class, age, physical status) influence the school experience? Do schools provide opportunity and initiate change, or do they perpetuate the status quo in economic, political, and social life? Who goes to school, where, for how long, and with what result? How does educational advantage get translated into jobs and social status? Encourages students to draw on their own experiences to develop paper topics.

SOC 1168 The Social Movements of the 1960s 4 QH

Considers the social and cultural movements of the 1960s and their origins in the Civil Rights movement. Examines the opposition to government policies and social norms that developed into the Civil Rights, student, New Left, antiwar, countercultural, and women's movements in order to understand their grievances, goals, composition, and impact.

SOC 1170 Race and Ethnic Relations 4 QH

Focuses on racial and religious groups, particularly with reference to the United States. Places special emphasis on historical development, specific problems of adjustment and assimilation, and specific present-day problems and trends. *Prereq.* SOC 1100 or equivalent.

SOC 1171 Race and Ethnic Relations: A World Perspective 4 QH

Offers a cross-cultural analysis of race and ethnic relations in Western and non-Western societies. Examines race and ethnic relations in terms of contemporary developments, world problems, and ideological conflicts.

SOC 1175 Sociology of Work 4 QH

Analyzes dramatic changes occurring in the work lives of Americans and considers the future of American workers within the global economy. Explores emerging labor markets, gender, race, and technology in shaping contemporary American work settings. (VT)

SOC 1176 Sociology of Business/Industry 4 QH

Focuses on the role of industry in modern society. Examines similarities and dissimilarities among industrial societies, bureaucracy and its alternatives, unions, supervision democracy and manipulation, the worker on the assembly line, sabotage of the organization, and the role of wages and alienation.

SOC 1177 Social Roles in the Business World 4 QH

Analyzes the social structure of corporate and business life in contemporary America. Presents and discusses case studies from major accounting and/or industrial firms. Examines the "career line" in the world of business and management, with a special focus on age/sex, racial/ethnic, and class/income barriers.

SOC 1178 Women Working 4 QH

Discusses the fact that differences in the labor force experience of men and women workers generally go unrecognized, and the work experience most common to women—household work—is rarely analyzed. Covers women's market and nonmarket activities, their rewards, and their problems, in addition to empirical and theoretical analyses of the work roles of women. Overall, underscores the differences between work experiences of men and women.

SOC 1180 Sociology of Consumerism and Consumer Behavior 4 QH

Provides students with an opportunity to explore a relevant consumer issue.

SOC 1185 Deviant Behavior and Social Control 4 QH

Explores the conditions under which people categorize others as deviant; processes by which persons so defined are assigned deviant status and assume appropriate roles and self-images; development of deviant careers and their relation to deviant subcultures; situations in which people transform deviant identity.

SOC 1190 Juvenile Delinquency 4 QH

Examines the sociological and psychological approaches to and their implications for a typology of delinquency. Discusses problems of prevention, treatment, and rehabilitation.

SOC 1195 Drugs and Society 4 QH

Offers an introduction to the sociology of drugs. First examines social definitions of drugs, conditions of their use, and socialization into drug use. Then considers deviant drug use and effects of social control on definitions and use. Considers a range of licit and illicit drugs, but gives major emphasis to alcohol, marijuana, and heroin.

SOC 1200 Sociology of Alcoholism 4 QH

Focuses on social responses to deviant alcohol use. Examines drinking cultures and drinking practices in the United States; processes by which people are labeled "alcoholics"; and the role of agencies of social control, such as the criminal justice system and the health care system, in labeling and in rehabilitation.

SOC 1201 Alcohol Use and Social Control 4 QH

Examines how societies define and enforce rules on alcohol use, including the conditions under which controls, informal and formal, come into being, and the consequences of these controls. Examines case studies of Prohibition, liquor control, public drunkenness, alcoholism, legal drinking age, drinking and driving, and drinking in college.

SOC 1202 Sociology of Drinking 4 QH

Examines how different groups and societies organize drinking as a social act and the consequences of that organization. Singles out for particular attention the cultural meaning assigned to drinking, the social elements found in all drinking situations, how members of social groups learn how to drink, and the social and psychological functions of drinking.

SOC 1205 Law, Crime, and Social Justice 4 QH

Analyzes the impact of the legal system on the creation and perpetuation of criminality in contemporary American society. Devotes particular attention to the study of the creation of criminal law, the judicial process, and the role of law in the gap between crime and social justice. Suitable for students in prelaw, criminal justice, political science, and allied fields.

SOC 1206 Class, Crime, and the Police**4 QH**

Summarizes the major psychological, social, biological, economic, and political theories about the cause of crime. Applies these theories to the daily operations of the police, courts, and prison system in the United States. Examines white collar crime and the class bias inherent in the more lenient treatment of elite criminals.

SOC 1215 Sociology of Health**4 QH**

Examines illness and illness in the socio-political context. Focuses on the health professions, the health system, issues of cost, and availability of care. Compares the United States system with those of Western Europe, Eastern Europe, and the Third World. *Prereq.* SOC 1100 or permission of instructor.

SOC 1217 Women, Health, and Social Change**4 QH**

Examines how women have traditionally been viewed by the medical field and how reproduction and childbirth came to be defined as medical problems. Also examines the implications for women in the changes that have taken place in health care, especially as these pertain to new reproductive frontiers and alternative health care facilities. Discusses the role of women in the health care professions.

SOC 1225 Aging and Society**4 QH**

Surveys issues and questions on aging, with special attention to social and economic consequences of the aging process, including retirement and productivity, health care problems, nursing home residences, widower- and widowhood, and the approach of death. Presents examples relating to aging in other cultures in a search for new answers to social problems of aging in the United States. Gives students the opportunity to learn to anticipate, cope with, and even prevent problems of aging that concern self, family, and clients/patients.

SOC 1235 Death and Dying**4 QH**

Focuses on the treatment of death and dying, including problems faced by health care professionals, family members, institutions, the funeral industry, and the dying themselves. Discusses cross-cultural perspectives, the social distribution of mortality, the changing nature of death, and the ethical problems in determining life and death with particular attention to such issues as abortion, suicide, and ceasing medical intervention. *Prereq.* SOC 1100 or permission of instructor.

SOC 1240 Sociology of Human Service Organizations**4 QH**

Introduces selected theoretical perspectives on human service organizations, emphasizing defining organizational goals and effectiveness. Gives students the opportunity to become familiar with the nature of human service organizations; to compare these organizations to business and industrial organizations; to outline specific problems that human service organizations face; and to propose potential solutions.

SOC 1245 Sociology of Poverty**4 QH**

Analyzes American poverty in historical perspective, drawing on comparisons with other countries. Critically evaluates of sociological research and theories relating to poverty. Considers causes and effects of poverty, as well as societal responses to poverty and its consequences. Suitable for students in applied fields, such as nursing, criminal justice, education, allied health, pre-med, and pre-law.

SOC 1247 Food and Hunger**4 QH**

Examines the social causes and consequences of hunger and alternative approaches to solving world hunger.

SOC 1250 The Sociology of Private and Public Assistance**4 QH**

Helps students understand why public and private assistance in the United States takes the form it does. Examines the ideology behind the welfare system, the kinds of assumptions made about the poor, how other countries deal with the problem, the effects of poverty in the United States, and some explanations for its continuing existence.

SOC 1255 Sport in Society**4 QH**

Analyzes the social origins and functions of leisure activities, with special emphasis on games and sports as forms of leisure. Gives considerable emphasis to cross-cultural and historical analysis, as well as to the relation between leisure activities and various social institutions—economy, polity, family, and religion. (See SOA 1255.)

SOC 1275 Sociology of the Arts**4 QH**

Examines the relation between the social organization of society and the forms of art produced—the social role of the artist, how the arts are “manufactured” and distributed, the art consumer’s relation to art and the artist, social support for the arts. Deals with a variety of art forms, with emphasis on the performing arts.

SOC 1276 Sociology of Popular Culture**4 QH**

Presents a sociological analysis of popular culture, focusing on the relationship between pop culture and social institutions such as religion, the law, education, the economy, and the family; the organizations and artistic communities that produce pop culture such as the music industry, theatrical groups, advertising agencies; and the social roles and socialization processes associated with individual artists. Examines changes in popular culture from the viewpoint of changes in the larger society.

SOC 1284 Technology and Careers of the Future**4 QH**

Focuses on new technologies and their social impacts on work and careers in the future. Examines sociological and humanistic approaches to technical change in the shop floor, offices, and professions. Also covers issues of design and control, health, employment, and autonomy.

SOC 1285 Environment Technology and Society**4 QH**

Discusses the following questions: Does society control technology or is technology directing society? Has technology become dehumanized? How valid is the doctrine of technological inevitability? Can the technological “fix” be viewed as a solution to social problems? Is technology itself a social problem? What can be expected of technology assessment? What of the back-to-nature and antitechnology movements today: are they the waves of the future? Expects students to do considerable independent study and research. (VI)

SOC 1286 Science and Society**4 QH**

Examines the profound effects of science on our society, and the ways in which political, economic, and social forces have guided developments in science. Explores issues such as “responsibility” created by this interdependence. Emphasizes the social structures within which science operates and is communicated and science as an occupation and profession, as well as a system of thought and set of tools for producing knowledge. (VI)

SOC 1287 Society Tomorrow: Forecasting Alternative Futures**4 QH**

Introduces students to the area of “social futures” or “future studies.” Examines the major techniques used to forecast futures and the specific scenarios and projections about the social world of tomorrow. Considers the major prospects and problems for society in the future.

SOC 1290 Military and American Society in a Nuclear Age 4 QH

Investigates the relationship between the military and society. Covers selected issues, including the impact of the military on social institutions such as the family, polity, and economy, the arms race and upheaval in social life, the post-cold war legitimization crisis of the United States military, the role of women and minorities as reserve armies, and military spending and domestic social problems.

SOC 1300 Classical Social Thought 4 QH

Traces the development of sociology from the history of social thought. *Prereq.* Three sociology/anthropology courses.

SOC 1301 Current Social Thought 4 QH

Reviews the dominant theoretical traditions in contemporary sociology, particularly the pluralist, managerialist, Marxist (or class), and feminist paradigms. Emphasizes Parsonian functionalism; symbolic interactionism; power elite and conflict theory; and neo-Marxist theories of the state, family, economic crisis, imperialism, and global ecological crisis. *Prereq.* Three sociology or anthropology courses.

SOC 1302 Female Perspectives on Society 4 QH

Examines social science and interdisciplinary feminist literature that focuses on women in families and at work, and that deals with physical issues including violence against women and abortion. Incorporates the perspectives of women of color. Considers and evaluates women's views of social life as well as recognizes the differences among women. (VI)

SOC 1310 Class, Power, and Social Change 4 QH

Focuses on theories of social inequality as applied to the exercise of power and large-scale social change. Examines contemporary events in order to understand power structures. Required of majors. (V) *Prereq.* One sociology course and middler standing or permission of instructor.

SOC 1320 Introduction to Statistical Analysis 4 QH

Examines the application of the principles of measurement, probability, measures of centrality, tests of significance, and techniques of association and correlation to social data. *Prereq.* SOC 1100 or permission of instructor.

SOC 1321 Research Methods 1 4 QH

Introduces students to the research process through an examination of the rules of evidence in empirical research and the place of values. Gives students the opportunity to learn how to design and critique types of sociological research, how to collect qualitative and quantitative data, and how to sample populations. *Prereq.* SOC 1100 and SOC 1320, or permission of instructor.

SOC 1322 Research Methods 2 4 QH

Requires students to complete the research project begun in SOC 1321. Focuses on practice coding, building indexes, scaling, table construction; introduction to use of the computer. *Prereq.* SOC 1100, SOC 1320, and SOC 1321, or permission of instructor.

SOC 1324 Human Services Research and Evaluation 4 QH

Covers basic issues in applied research and the evaluation of services, including the purposes of evaluation, ethics, formulating questions and measuring answers, designing evaluations and planning oriented research, utilizing evaluation results, and the turbulent setting of action programs. Suitable for students majoring in human services, sociology, psychology, nursing,

health education, and related fields. *Prereq.* SOC 1320 or other statistics, SOC 1240, or permission of instructor.

SOC 1335, SOC 1336 Group Behavior 1, 2 4 QH each

Explores how individuals interact in groups and how groups interact with each other. Focuses on the reflexive self, social aspects of language, situational learning, group perspectives, careers, institutions, and worlds.

SOC 1345 American Demographics 4 QH

Offers an applied research experience in which students have the opportunity to study the major areas of demography. Focuses on the resources of the United States Census Bureau and, in particular, the data products available from recent census surveys.

SOC 1347 Community Analysis 4 QH

Explores types of human settlements, focusing on the interaction between people and their political, economic, and social environments. Discusses power structure and citizen action to influence institutions; skills in community analysis, including use of documents, survey, observation, and evaluation of needs and resources; strategies of conflict, cooperation, and negotiation to attain community and group ends.

SOC 1348 Seminar in Urban Studies 4 QH

Compares interdisciplinary approaches to urban studies according to problem areas and research methods. Gives students the opportunity to extend previous term paper projects after exposure to social action and social systemic theoretical perspectives. *Prereq.* SOC 1147 or permission of instructor.

SOC 1350 Women in Jewish Culture 4 QH

Uses some of the tools of contemporary feminist theory and methodology to focus on questions about the resurgence of ethnic/religious identities in the United States and the meaning of this for contemporary Jewish women. Analyzes the changing relationship of women to Judaism by trying to recover Jewish women's experiences in America since the turn of the century by looking at some key institutions—work, family, religion, the feminist movement, the media, literature, and film.

SOC 1355 Politics and Economy in U.S. Society 4 QH

Examines the political economy of United States capitalism. Focuses on the impact of new forms of economic crisis on politics, social classes, labor, and the state.

SOC 1360 Social Class, Status, and Power 4 QH

Focuses on theories of social inequality, concepts of social class, aspects of status and role difference, and criteria for social mobility.

SOC 1365 Collective Behavior 4 QH

Focuses on the rise of new group forms in response to persistent social unrest; masses, crowds, and publics; specific instances of collective behavior such as race riots, wildcat strikes, prison revolts, and campus disorders.

SOC 1375 Sociology of Occupations and Professions 4 QH

Considers occupations and professions as institutions in a broader socio-political context. Includes a historical and international perspective on topics such as training, professional associations, professional services, and the relation of professional groups to capitalism and to states. *Prereq.* Four sociology or anthropology courses or permission of instructor.

SOC 1376 Organization and Bureaucracy

4 QH

Focuses on sociological study of organizations. Examines case studies of private corporations, federal bureaucracies, social service agencies, military-industrial complex, high-risk technological systems, unions. Analyzes recent theories of innovation, participation, and opportunity in complex organizations.

SOC 1385 Social Deviance 2

4 QH

Examines the leading theories of deviance (anomie, subcultural deviance, labeling) and their principal variants; studies their assumptions, conceptions, propositions, and supportive evidence; analyzes empirical studies in each theoretical tradition.

SOC 1470 Sociology of Religion

4 QH

Offers a comparative and analytic treatment of religion as a social institution, focusing on the relations between religious organizations and other social institutions, with particular emphasis on the American experience. Analyzes religion as an agent of social change and stability. *Prereq.* SOC 1100.

SOC 1475 The Sociology of Mass Communication

4 QH

Focuses on factors in the formation and development of public opinion, the effect of television on children, mass communication as social organization, media-depicted images of society, the role of personal influence, the process of rumor, the use of mass media by the poor, propaganda analysis, and the latent and manifest functions of mass communication.

SOC 1485 Computers and Society

4 QH

Examines the impact of the computer revolution on the conditions of work and life in contemporary society including legal and theoretical issues. Discusses ethical and professional issues in computer use. (VI) *Prereq.* Junior in computer science or middler with ability to program.

SOC 1500 Applied Sociology: Practice and Theory

4 QH

Analyzes the conditions under which sociological knowledge is applied to social problems, the kinds of problems, and the degree of effectiveness of this application. Pays particular attention to research and demonstration projects that derive from sociological theory.

SOC 1501 Social Policy and Social Intervention (Formerly Social Control 2)

4 QH

Focuses on study of the formation of social policies in response to social problems; analyzes policies and problems, supporters and opponents of policy change, conditions under which control agencies adopt new policies, and effects of policy change. Places particular emphasis on case studies of social action and legal change.

SOC 1525 Comparative Human Services 1

6 QH

Offers an intensive look at the American human services system. Gives upper-level undergraduate and graduate students the opportunity to study the origins, development, and present state of human services in the United States. Involves lectures as well as field visits in the Boston area. Provides independent study.

SOC 1526 Comparative Human Services 2

6 QH

Offers an intensive study of the British human services system. Provides students the opportunity to immerse themselves in the social and cultural context of British human services and involves field trips in London designed to examine firsthand the planning, administration, and delivery of human services in Great Britain.

SOC 1535 Seminar in Social Welfare

4 QH

Discusses problems in social welfare observed in the term between "Problems" and "Practicum." Requires a research paper, based on directed fieldwork in the intervening term.

SOC 1601 Seminar in Current Emphases in Sociology

4 QH

Reviews and discusses selected sociological topics. *Prereq.* Junior or senior standing in sociology/anthropology or permission of instructor.

SOC 1700 Introduction to Sociology (Honors)

4 QH

Honors equivalent of SOC 1100.

SOC 1710 Class, Power, and Social Change (Honors)

4 QH

Honors equivalent of SOC 1310. Any Honors Program member is eligible to enroll in this course.

SOC 1800, SOC 1801, SOC 1802, SOC 1803 Directed Study

4 QH each

Offers independent work on a chosen topic under the direction of members of the department. Limited to qualified students with approval of department chair. *Prereq.* Junior or senior standing in sociology or permission of instructor.

SOC 1821, SOC 1822, SOC 1823, SOC 1824

4 QH

Junior/Senior Honors Project

For details contact the honors office.

Theatre

THE 1100 Introduction to Theatre Arts

4 QH

Focuses on theatre in performance by examining the work of theatre artists (actors, designers, directors, and playwrights). Introduces students to the dynamics of performance and to the reading of play texts, and provides a brief overview of the development of Western theatre. (II)

THE 1106 Theatre History 1—Beginnings to Renaissance

4 QH

Explores the history of the theatre and its development in the West, focusing on Greece, Rome, Medieval Europe, Golden Age Spain, and Elizabethan and Stuart England. (Can be taken independently of THE 1107.)

THE 1107 Theatre History 2—Renaissance to Naturalism

4 QH

Focuses on the development of theatre in the Italian Renaissance; the spread of Italianate forms throughout Europe during the seventeenth and eighteenth centuries; the rise of Romanticism in Germany and its spread; and the rise of realism and naturalism in France, Scandinavia, and throughout Europe. (Can be taken independently of THE 1106.)

THE 1111 American Musical Theatre

4 QH

Traces the development of the American musical from *The Black Crook* to the present. Considers the role of musical theatre as both entertainment and serious art form through an examination of script, score, dance, and design. Includes works by composers and lyricists such as Rodgers and Hammerstein, Lerner and Loewe, Cole Porter, Bock and Harnick, Leonard Bernstein, and Stephen Sondheim.

THE 1112 Dramatic Theory and Criticism

4 QH

Examines the major theoretical statements about Western theatre from Greece to present day. Devotes a significant portion of the course to twentieth-century critical strategies.

THE 1114 Masters of the Theatre**4 QH**

Overviews several great practitioners of theatre. In particular, stresses how society influenced the thought and craft of playwrights, actors, directors, designers, and theorists. Pays careful attention to how the play's ideas are translated into performance. Uses video, discussion, and live performance, when possible, as integral elements in the course. (III)

THE 1116 The American Theatre**4 QH**

Traces the historical development of theatre in America, as well as its role as a social institution, economic enterprise, and art form.

THE 1118 Black Theatre in America**4 QH**

Surveys the history of black theatre artists in America from the time of Ira Aldridge to the present day. Also examines the works of black playwrights from the Harlem renaissance to the present, with an emphasis on the period beginning with Baraka's *Dutchman*.

THE 1121 Contemporary Theatre**4 QH**

Examines the current state of commercial, regional, and other noncommercial theatre in the United States, using readings, lectures, reports, and weekly visits to theatre productions in the area. Explores through lectures the background of these types of theatre in twentieth century American and European theatre.

THE 1127 The Comic Theatre**4 QH**

Surveys theatrical comedy from the ancient Greeks to the present. Examines the comic playwright, the comic director, and the comedic actor. Discusses theories and techniques of laughter, as well as the psychological and sociological benefits derived from laughter. Includes reading playscripts by Aristophanes, Molière, Shakespeare, Shaw, and Simon as well as viewing and listening to tapes of Chaplin, the Marx Brothers, and others. Examines comedy devices through lectures, films, records, and attending live performances.

THE 1140 Playwriting 1**4 QH**

Offers students the opportunity to develop a series of dramatic dialogues that culminate in the writing of a one-act play. Uses a workshop format.

THE 1149 Script Analysis for the Stage**4 QH**

Aids the theatre practitioner in developing the skills necessary for analyzing scripts in preparation for production. Focuses on dramatic theory and structure and theatrical techniques that will enable an actor, director, designer, or playwright to uncover the problems of translating theory into practice. *Prereq.* *Theatre major or minor*.

THE 1150 Introduction to Acting**4 QH**

Focuses on fundamental techniques of stage use, the actor and the stage environment, and improvisations for strengthening imagination and increasing freedom of expression.

THE 1155 Voice for the Theatre**4 QH**

Focuses on vocal exercises that enable the actor to better connect with the voice through freeing the physical and emotional self. Emphasizes centering, physicalization, breath support, articulation, resonance, projection, and relaxation. Includes selected monologues and/or scenes for classroom analysis.

THE 1160 Movement 1**4 QH**

Emphasizes using the body as an expressive instrument for Realism. Develops concentration, control, and stamina through exercise, relaxation, improvisation, manipulation of energy flow, rhythms, and imagination. *Prereq.* *Theatre major or permission of instructor*.

THE 1180 Concepts of Direction**4 QH**

Focuses on purposes and techniques of theatrical direction related to script analysis, production style, pictorial composition, rhythmic evolution, and empathic responses. *Prereq.* *THE 1150 and THE 1212*.

THE 1200 Stagecraft**4 QH**

Focuses on principles that underlie the coordination and execution of technical production. Examines different kinds of scenery, tools, equipment, and construction materials. Lab work involves preparing technical elements of University productions. *Prereq.* *Theatre major or permission of instructor*.

THE 1209 Theatrical Drafting**4 QH**

Exposes the student to the basic graphics language needed to translate a designer's ideas into technical drawings used for construction through work on supervised classroom projects. *Prereq.* *THE 1200*.

THE 1210 Scenic Design for the Stage**4 QH**

Introduces the theory and practice of theatrical design and the role of the designer in the production process. Through project work, examines the use of the graphics tools—line, form, balance, color, rhythm, etcetera—in the development of the design idea. Emphasizes understanding and utilizing spatial relationships, visually expressing conceptual themes, and understanding the various uses, problems, and practical considerations of proscenium, thrust, and arena staging. Analyzes historical production styles from the Greco-Roman period through the nineteenth century. *Prereq.* *THE 1200, THE 1212, or permission of instructor*.

THE 1212 Introduction to Theatrical Design**4 QH**

Introduces the visual effects of modern theatrical production and the creative processes by which these come into being, through a basic survey of the three major design disciplines, their supporting technology, and their working interrelationship. Addresses the questions of how artistic concepts are developed and related, how they are communicated to other artists and an audience, and how one develops the critical processes necessary to evaluate these concepts.

THE 1213 Scene Design 2: Principles**4 QH**

Focuses on the development and expression of conceptual statements from specific dramatic texts through a series of exercises involving script analysis and introductory work in rendering and model construction. Examines texts selected from works of distinct historical and stylistic periods. Studies the heritage of twentieth-century theatrical design through the work of artists such as Appia, Craig, Jones, Urban, and Oenslager. Emphasizes the development of such stylistic treatments as realism, expressionism, symbolism, and constructivist and environmental design. *Prereq.* *THE 1210*.

THE 1225 Scene Painting**4 QH**

Traces the history of scene painting and ornament from classical to contemporary times. Focuses on studio organization, color,

color theory, equipment, tools, materials, and costs involved with painting stage scenery. Uses projects and exercises in the use of different media, matching colors, painting of textures, light and shade, and the use of stencils and physical textures. Includes lab sessions involving painting stage scenery for University productions. *Prereq.* THE 1200 or permission of instructor.

THE 1226 Lighting Design for the Stage 4 QH

Examines basic principles and practices of stage lighting, including the qualities and functions of light, lighting instruments and controls, basic electricity, color in light, and analysis of the script in terms of light requirements. Expects students to develop light plots and schedules for various kinds of stage productions. Includes lab work on lighting crews for University productions. *Prereq.* THE 1200, THE 1212, or permission of instructor.

THE 1261 Costuming I 4 QH

Presents the beginning designer with the opportunity to investigate costume design theory and to foster perceptual development. Through lectures and projects, gives students the opportunity to explore both the abstract and historical aspects of costume design as well as textual analysis and its conceptual implications. (Does not require prior art or design education.)

THE 1265 Pattern Drafting and Costume Construction 4 QH

Develops the skills and techniques necessary for the patterning, cutting, and construction of costumes for the stage. Covers flat pattern drafting, draping, and finishing techniques.

THE 1280 Stage Makeup 4 QH

Focuses on the principles of, the reasons for, and the materials used in makeup for the theatre, television, and films. Includes the practical application of types and styles of makeup—straight, old-age, character, and corrective. *Prereq.* Theatre major or permission of instructor.

THE 1284 Theatre Management 4 QH

Focuses on problems of financing, promoting, and programming for profit and nonprofit professional theatre.

THE 1292 Children's Theatre 4 QH

Focuses on theories and methods of creative techniques related to children's programs in schools, churches, and recreational facilities. Analyzes literature in preparation for production of children's plays.

THE 1300 Acting 2 4 QH

Focuses on developing the actor's sense of truth and emotional freedom. Emphasizes creating, developing, and sustaining character and developing ensemble. Includes monologues and scenes performed for classroom analysis. *Prereq.* THE 1150 and permission of department chair.

THE 1301 Acting 3 4 QH

Focuses on further development of the actor's tools, script and character scoring, and exercises for physical and psychological freedom. Includes in-class scenes from works in progress. *Prereq.* THE 1300 and permission of instructor.

THE 1302 Acting 4 4 QH

Deals with scene work from a spectrum of theatrical genre. Focuses on developing a technique for approaching a role through research, character, and language. *Prereq.* THE 1301 and permission of instructor.

THE 1316 Acting for the Camera (Television) 4 QH

Presents the fundamentals of camera acting, adjusting the actor's physical responses to the mechanical eye of the camera and the delicate ear of the microphone. Involves studio work before the television camera to explore the genres of dramatic, commercial, and industrial acting. *Prereq.* THE 1155, THE 1160, and THE 1302.

THE 1325 Musical Theatre Technique 4 QH

Applies acting technique to the performance of musical material. Explores song through text and character progression, develops a process for approaching a song, and synthesizes movement, gesture, and emotion with melody, rhythm, and lyrics. Involves student performances of solo, small ensemble, and large ensemble material. Does not involve singing technique. *Prereq.* THE 1150, THE 1300, and permission of instructor.

THE 1370 Rehearsal and Performance 4 QH

Allows students to participate in public performance through preparation and rehearsals in areas of acting, directing, design, and stagemanaging. *Prereq.* Permission of instructor.

THE 1400 Costuming 2 4 QH

Offers advanced study in textual interpretation and its application to costume design. Emphasizes conceptual and stylistic development through assigned projects in the various genres of the performing arts. *Prereq.* THE 1261 or permission of instructor.

THE 1410 Technical Production 4 QH

Allows the opportunity to acquire and explore the requisite skills for developing working drawings and budgetary analyses for theatrical productions. Focuses on several projects and includes the opportunity to coordinate one substantial production. Requires that the specialized study be executed in close supervision with the instructor. *Prereq.* All courses in production/design concentration and permission of instructor.

THE 1420 Advanced Drafting and Construction 4 QH

Offers specialized study in technical production techniques. Covers drafting procedures necessary for the conversion of designer's drawings into detailed rear elevation and construction layouts, as well as the development of section, isometric, and oblique views. Through a series of practical and project exercises, analyzes the various factors governing the construction and rigging of two- and three-dimensional scenery, linear-motion, rotary-motion, and elevating systems. Emphasizes theatrical problem solving with regard to safety, dependability, and economy. Lab fee. *Prereq.* THE 1209.

THE 1430 Lighting Design 2 4 QH

Offers an intensive study of lighting design theory and practice. Expects students to design numerous lighting plots, sections, instrument schedules, and design concepts for various types of productions and spaces. Investigates and discusses current professional techniques and practices. *Prereq.* THE 1226.

THE 1505 Continental Drama 4 QH

Covers seminal late nineteenth- and mid-twentieth-century continental drama. Focuses on playwrights whose plays had a major impact on modern drama and theatre.

THE 1510 Twentieth Century Theatre**4 QH**

Studies the history of the post-naturalistic theatre in Europe and the United States. Explores the work and influence of such figures as Craig, Appia, Meyerhold, Brecht, Artaud, Grotowski, Beck and Molina, Schechner, and Chaiken.

THE 1800, THE 1801, THE 1802, THE 1803 Practicum in Production**1 QH each**

Offers lab practice in technical production; can be repeated for credit (maximum four credits). *Prereq. Departmental permission.*

THE 1810, THE 1811, THE 1812, THE 1813**4 QH each****Junior/Senior Honors Project**

For details contact the honors office.

THE 1820, THE 1821, THE 1822, THE 1823 Directed Study**4 QH each****THE 1840, THE 1841, THE 1842, THE 1843, THE 1844, THE 1845, THE 1846, THE 1847, THE 1848, THE 1849****4 QH each****Special Topics in Theatre Performance**

Offers opportunity for in-depth examination of a subject of particular significance to the field.

THE 1860, THE 1861, THE 1862, THE 1863, THE 1864, THE 1865, THE 1866, THE 1867 Special Topics in Theatrical Design**4 QH each**

Offers opportunity for in-depth examination of a subject of particular significance to the field.

THE 1890, THE 1891, THE 1892, THE 1893**4 QH each****Special Topics in Theatre History/Dramatic Criticism**

Offers opportunity for in-depth examination of a subject of particular significance to the field.

Business Administration

Accounting

ACC 1111 Financial Accounting 4 QH

Covers the nature, function, and environment of accounting; the basic accounting model; financial and analytical ratios; the evaluation of accounts receivable; the control of inventory; the acquisition, disposal, and depreciation of plant and equipment; short- and long-term debt financing; and corporate stockholder equity. This first of a series of accounting courses assumes students do not possess knowledge of the subject. Both this course and ACC 1112 are designed to help provide an understanding of accounting issues and objectives for proper interpretation and analysis of financial accounting information. *Prereq.* Sophomore standing.

ACC 1112 Managerial Accounting 4 QH

Introduces students to managerial accounting reports and decisions through class discussions, exercises, and demonstration problems. Specific topics covered include the statement of case flows; ratio analysis; cost measurement and behavior; cost-volume-profit analysis; budgeting and variances; and relevant costs for decisions. *Prereq.* ACC 1111 and sophomore standing.

ACC 1331 Intermediate Accounting I 4 QH

Constitutes the principal foundation course for accountants; includes a comprehensive review of the conceptual framework of accounting. Emphasizes the preparation of financial statements and their use in decision making. Stresses the development of accounting theory in the analysis of alternative accounting treatments and procedures. Pays particular attention to cash, accounts receivable, and inventories. *Prereq.* ACC 1111 or equivalent and middler standing.

ACC 1332 Intermediate Accounting 2 4 QH

Continues the study of accounting principles, concepts, and procedures introduced in ACC 1331. Emphasizes the conceptual aspects of measuring and reporting liabilities and alternative accounting treatments and procedures. *Prereq.* ACC 1331 and middler standing.

ACC 1339 Cost Accounting 4 QH

Develops understanding of the critical role of cost measurement in business decisions and in managing a firm's profitability. Studies alternate ways of measuring costs to meet different management objectives, the role of budgeting as a planning and management tool, and the use of cost analysis as a control tool to help management meet short- and long-term profit objectives. *Prereq.* ACC 1112 and middler standing.

ACC 1343 Intermediate Accounting 3 4 QH

Completes the intensive study of measurement and reporting issues of modern accounting practice. Emphasizes the conceptual and procedural aspects associated with the reporting of stockholders equity, earning per share, and deferred taxes. *Prereq.* ACC 1332 or permission of instructor.

ACC 1345 Accounting Systems 4 QH

Examines the process of analyzing and designing financial accounting systems. Uses a conceptual approach to consider the appropriate use of computer technology in designing new systems. Covers system analysis and design concepts, files and database design, and how to control specific accounting applications.

Provides hands-on experience in operating a computerized accounting system. *Prereq.* ACC 1331, introductory computer course, or permission of instructor, and middler standing.

ACC 1347 Auditing 4 QH

Examines audit concepts, standards, and procedures, including the auditor's legal and ethical responsibilities, the auditing profession, auditing standards, code of professional conduct, auditor's reports, evidence, internal control structure, statistical sampling, legal liability, and substantive testing. *Prereq.* ACC 1332 or ACC 1343.

ACC 1351 Federal Income Taxes 1 4 QH

Emphasizes basic understanding of the federal income tax structure relating to individuals. Requires completion of tax return problems and research cases directed at addressing various tax situations. Through these projects, the different sources of tax authority are introduced. *Prereq.* ACC 1332 or permission of instructor.

ACC 1512 Federal Income Taxes 2 4 QH

Continues the examination of the federal income tax system. Emphasizes the tax implications of property transactions and choice of business entity. Transactions between owners and business entities are also examined. A major emphasis is given to tax planning considerations, especially corporate tax consequences. *Prereq.* ACC 1351.

ACC 1521 Advanced Accounting 4 QH

Analyzes accounting theory and practice in various areas for the student planning a career as a professional accountant. Includes accounting for partnerships; business combinations and consolidated financial statements; bankruptcy, liquidation and reorganization; accounting for multinational enterprises; segments, interim reporting, and reporting to the SEC; and accounting for governmental units. *Prereq.* ACC 1343 or permission of instructor.

ACC 1591 Independent Study 1 QH

Allows students who have received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study will take place. A copy of the final report prepared by the student will be presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from area coordinators.

ACC 1592 Independent Study 2 QH

Same as ACC 1591.

ACC 1593 Independent Study 3 QH

Same as ACC 1591.

ACC 1594, ACC 1595, ACC 1596, ACC 1597 Independent Study 4 QH

Same as ACC 1591.

ACC 1711 Accounting Principles 1 (Honors) 4 QH

See course description for ACC 1111.

ACC 1712 Accounting Principles 2 (Honors)
See course description for ACC 1112.

ACC 1891 Honors Thesis in Progress

ACC 1892 Honors Thesis

ACC 1893 Honors Thesis in Progress

ACC 1894 Honors Thesis

4 QH

0 QH

8 QH

0 QH

12 QH

must be accompanied by a supporting statement from the supervising faculty member under whose direction the study will take place. A copy of the final report prepared by the student will be presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from area coordinators.

ENT 1592 Independent Study **2 QH**
Same as ENT 1591.

ENT 1593 Independent Study **3 QH**
Same as ENT 1591.

ENT 1594, ENT 1595, ENT 1596, ENT 1597 Independent Study **4 QH**
Same as ENT 1591.

ENT 1598 Independent Study **8 QH**
Same as ENT 1591.

ENT 1891 Honors Thesis in Progress **0 QH**

ENT 1892 Honors Thesis **8 QH**

ENT 1893 Honors Thesis in Progress **0 QH**

ENT 1894 Honors Thesis **12 QH**

Entrepreneurship

ENT 1330 Entrepreneurship **4 QH**

Introduces entrepreneurship, focusing on the following questions: What is entrepreneurship and how do you become an entrepreneur? How do you find or create ideas that might become businesses? How can you determine if the ideas have merit in the marketplace? How do you start a firm that, from the beginning, is market oriented and focused on what customers need and are willing to buy? Gives students an opportunity to conduct detailed evaluations of new business ideas.

ENT 1344 Starting and Managing a New Business **4 QH**

Identifies the key principles and practices needed to start a business from the initial idea to the management of profits and further expansion. Covers such topics as alternative approaches to business entry, initial team building, managing interactions with initial customers, establishing control systems, legal matters, and building necessary external relationships. Gives students an opportunity to analyze a new venture.

ENT 1352 Planning and Growing New Ventures **4 QH**

Focuses on how entrepreneurs turn small businesses into larger businesses. Includes planning, forecasting sales, increasing production, designing new products or services, designing distribution and managing a sales force, managing personnel, using strategic linkages with other companies to increase market presence, and working with a growing customer base. Discusses how to manage a small firm in hard financial times. Offers students an opportunity to develop comprehensive business plans for new or existing businesses as term projects.

ENT 1358 Small Business Institute **8 QH**

Provides students with an opportunity to apply their business training through an analytical, problem-solving technique learned in the classroom. Expects student teams to interact with owners and managers of local small businesses to analyze problems and opportunities and develop recommendations, and to devote the equivalent of two days per week to collecting information. Combines experience with occasional class meetings and frequent team meetings with a faculty member. Sponsored by the United States Small Business Administration (SBA). Requires students to present interim progress reports and final written and oral reports to the client company and the SBA. *Prereq.* Junior standing or permission of instructor.

ENT 1591 Independent Study **1 QH**

Allows students who have received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and

Finance and Insurance

FIN 1333 Financial Institutions and Markets **4 QH**

Explores the financial environment faced by a firm as well as the financial institutions serving the economy. Discusses the forces that determine the changes in money and capital markets and explores the implications of changing financial environment for the management of funds in a firm and/or financial institution. *Prereq.* ACC 1112 and middler standing.

FIN 1335 Managerial Finance **4 QH**

Provides students the opportunity to gain knowledge of the advanced tools and concepts used in the management of funds. Topics include inventory and credit policies, risk, capital budgeting, financial structure, cost of capital, dividend policy, and valuation of a firm. Overall financial strategy and timing of its implementation are also examined. Specialized topics—mergers and acquisitions, financial failure, and financial policy for multinational firms—may be considered in the course. *Prereq.* FIN 1439.

FIN 1346 Investment Management **4 QH**

Presents a broad overview of the concepts, practices, and procedures of investment management. Covers basic security types, security market operations, security analysis (both fundamental and technical), and an introduction to portfolio management. *Prereq.* FIN 1439.

FIN 1438 Principles of Finance I **4 QH**

Familiarizes students with the concepts, tools, practices, and procedures in financial management. Covers capital budgeting, valuation, time value of money, financial planning, analysis, and risk management. Uses problems, case discussions, spreadsheet analysis, and other computer-based teaching tools to enhance student understanding of financial concepts. *Prereq.* ACC 1111, MSC 1200, and middler standing.

FIN 1439 Principles of Finance 2**4 QH**

Introduces students to financial markets and financial institutions. Familiarizes students with security market operations and financial assets. Covers interest rate theory, risk and return, diversification, and equilibrium models of the risk-return trade-off. Uses problems, case discussions, spreadsheet analysis, and other computer-based teaching tools to enhance student understanding of financial concepts. *Prereq.* ACC 1112, MSC 1201, and middler standing.

FIN 1503 Taxes and Financial Decisions**4 QH**

Uses the case method to discuss a number of financial decisions that are greatly influenced by tax considerations, the most important of which are concerned with capital structure, dividend policy, acquisition terms, investment policies, and liquidations. The federal income tax receives primary consideration, but state and foreign taxes are also discussed. *Prereq.* FIN 1439 and middler standing.

FIN 1520 Options and Futures Markets**4 QH**

Explores the relatively new concepts of financial futures, options on financial futures, and listed options markets as developed to help corporations and financial institutions manage interest-rate risk. Topics include mechanics of these markets, techniques that can hedge interest rate exposure, tracing methods, and current developments in the field. *Prereq.* FIN 1346.

FIN 1526 Securities Markets**4 QH**

Analyzes the operation of the securities market. Provides students the opportunity to examine in detail the operation and function of investment bankers, broker-dealers, and securities exchanges. Studies the mechanics of cash and margin accounts, trading options, and regulations affecting securities markets. *Prereq.* FIN 1439.

FIN 1530 Working Capital Management**4 QH**

Examines strategies and analytical approaches to managing current assets and current liabilities. Explores corporate cash management under changing money market conditions. Discusses the use of interest rate futures and working capital management in a multinational context. *Prereq.* FIN 1439.

FIN 1531 Capital Investment Decision Analysis**4 QH**

Analyzes capital budgeting techniques and portfolio considerations, including risk analysis, capital structure and valuation, and other long-term corporate finance topics. *Prereq.* FIN 1439.

FIN 1538 Financial Ethics**4 QH**

Investigates and helps develop a systematic understanding of ethical dilemmas of financial business decision making. Examines the influence of business cultures on personal behavior, combining wisdom of the past with current ethical thinking and each individual's standards. *Prereq.* FIN 1438.

FIN 1540 Management of Financial Institutions**4 QH**

Studies the decision-making problems faced by financial institutions such as commercial banks, savings and investment institutions, and finance companies when viewed as competitive, profit-seeking business entities. Covers such topics as the nature and scope of the capital markets confronting institutions, specialized problems regarding the sources and uses of funds of financial institutions, the nature of competition, the regulation of financial institutions, and strategic policy planning of financial institutions. *Prereq.* FIN 1439 or FIN 1333.

FIN 1543 Modern Portfolio Management**4 QH**

Analyzes the methods of selection, revision, and performance measurement of asset portfolios. Exposes the students to the current methods of building an asset portfolio. Presents and evaluates the concept of the efficient frontier of assets in the risk-return space. Includes a simulated equity fund-management project, in which students select equity securities and then prepare and present annual reports evaluating their portfolios' construction and performance. *Prereq.* FIN 1346.

FIN 1544 Bank Management**4 QH**

Examines the financial management of commercial banks and thrift institutions. Analyzes the problems of liquidity and investment management, loan portfolio and capital management, and pricing problems associated with various sources and uses of funds in the context of changing economic and regulatory environment for these institutions. Presents lectures, discussions, and cases. *Prereq.* FIN 1439 or FIN 1333.

FIN 1545 Investment Banking**4 QH**

Focuses on the managerial functions of investment banking firms. Examines individual investors and institutions in the money and capital markets from the viewpoint of investment banking firms. Familiarizes students with the operating and cash flow characteristics of institutional and individual clients. *Prereq.* FIN 1439.

FIN 1549 Principles of Real Estate**4 QH**

Surveys the field of real estate, including principles of real estate law, valuation, brokerage, finance, land use, and negotiations. Gives the student the opportunity to become a better decision maker and to prepare for future studies in real estate. *Prereq.* FIN 1439.

FIN 1550 Real Estate Finance: Analysis and Investment**4 QH**

Presents real estate financing techniques, sources of funds, and investment property analyses. Examines the legal and financial aspects of such techniques as mortgage liens, leaseholds, contracts for deed, and sale-leasebacks, as well as the primary and secondary mortgage markets. Surveys methods of valuing income properties. *Prereq.* FIN 1549.

FIN 1562 Employee Benefits Management**4 QH**

Covers the design, implementation, and financing of corporate employee benefit plans. Presents a comprehensive analysis of qualified and non-qualified benefit and executive compensation plans. Emphasizes the proper management, design, and financing of these plans to achieve corporate goals at minimum feasible cost. Studies alternative methods of financing benefit and executive compensation plans. Includes recent developments in Social Security, benefits, and tax legislation. *Prereq.* FIN 1439.

FIN 1566 Risk Management and Insurance**4 QH**

Emphasizes the functional area of corporate risk management. Covers such areas as organizing and controlling the risk management function; identifying, measuring, controlling, and financing risk; selecting the best method of risk treatment; and implementing and monitoring risk management. Topics of exposure analysis include property, liability (public, employer, products, officers and directors, and professionals), income, and extraordinary expense losses. Covers treatment methods such as self-insurance, off-shore captive, retention groups, and commercial insurance. Includes recent developments such as tort reform integration of risk management with modern financial theory, as well as implications and analysis of recent tax reforms. *Prereq.* FIN 1439.

FIN 1580 Personal Financial Management 4 QH

Emphasizes the development of personal financial management expertise, based on an integrated plan for personal choices. Focuses on an overall personal economic plan and unites such diverse topics as inflation and investment selection, insurance, short- and long-run hedges against the purchasing power risk, and purchasing assets. Encourages decision making through analyzing alternative courses of action. *Prereq.* FIN 1438.

FIN 1582 Personal Insurance Planning 4 QH

Focuses on the informed decisions necessary to establish a comprehensive, rational plan of personal insurance. Examines through class discussion, lectures, and readings the various kinds of personal insurance and how to create an insurance package for clients with different insurance needs. *Prereq.* FIN 1438.

FIN 1591 Independent Study 1 QH

Allows the student who has received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study will take place. A copy of the final report prepared by the student will be presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from area coordinators.

FIN 1592 Independent Study 2 QH

Same as FIN 1591.

FIN 1593 Independent Study 3 QH

Same as FIN 1591.

FIN 1594, FIN 1595, FIN 1596, FIN 1597 Independent Study 4 QH each

Same as FIN 1591.

FIN 1739 Principles of Finance 2 (Honors) 4 QH

Continues FIN 1738. Builds upon the basic set of analytical tools and stresses application. Covers advanced capital budgeting, cost of capital, and long-term financing. Examines the implications of a firm's choice of capital structure and dividend policies. *Prereq.* FIN 1438 or FIN 1738.

FIN 1759 International Financial Markets 4 QH

Introduces international financial markets, including balance of payments, history of the international monetary system, exchange-rate determination, foreign-exchange-exposure hedging strategies, and international capital markets. Emphasizes how international financial markets work and how corporations must adapt their decision-making to the international environment. *Prereq.* FIN 1439.

FIN 1760 International Financial Management 4 QH

Examines how the financial strategies and policies of multinational corporations differ from domestic corporations and how financial management is utilized in an international setting to achieve corporate goals. Specific topics include cost of capital, capital budgeting, capitalization policies, and management techniques for dealing with exchange-rate exposure and working-capital issues. Knowledge of exchange rates is assumed. *Prereq.* FIN 1759.

FIN 1770 Small-Business Finance 4 QH

Uses basic processes, principles, tools, and concepts of finance within the parameters of a small business to develop a complete financial plan that projects the future circular flow of funds by analyzing and then integrating the impact of both investment decisions (use of funds) and financial decisions (source of funds). *Prereq.* FIN 1439.

FIN 1814 Financial Forecasting 4 QH

Discusses how accurate forecasts of product demand, retail sales, and cash-flow levels are critically important for companies regardless of size. Covers how effective financial forecasting integrates macroeconomic factors, particularly the business cycle, and institutional factors with appropriate quantitative methods. Addresses both issues—economic or business cycles and forecasting techniques—in sufficient depth so that students can obtain the skills necessary to build and interpret a basic forecasting model for business. *Prereq.* Honors participation or permission of instructor.

FIN 1818 Turnaround Management (Honors) 4 QH

Examines strategies for identifying companies likely to fail and selecting and implementing remedial actions. Covers such topics as business turnarounds, troubled companies, workouts, bankruptcies, and liquidations, using case studies and readings. Students will evaluate a turnaround plan. *Prereq.* Honors participation or permission of instructor.

FIN 1891 Honors Thesis in Progress 0 QH**FIN 1892 Honors Thesis 8 QH****FIN 1893 Honors Thesis in Progress 0 QH****FIN 1894 Honors Thesis 12 QH**

Human Resources Management

HRM 1332 Introduction to Human Resources Management 4 QH

Helps students develop understanding of contemporary issues in human resource management. Examines problems posed by changing work patterns, labor force characteristics, union activities, and government policies. Discusses and evaluates organizational experiments such as worker participation, job enlargement, and group incentives from a managerial perspective. *Prereq.* Middler standing.

HRM 1345 Contemporary Labor Issues 4 QH

Studies current issues dealing with labor in its broadest sense. Discusses and evaluates labor unions and manpower institutions as well as the emerging development and training problems motivated by unemployment, poverty, and changing work patterns. Reviews recent legislation dealing with the employment relationship. *Prereq.* Middler standing.

HRM 1348 Reward Systems: Wage, Salary, and Benefits Administration 4 QH

Examines one of the major functions of personnel administration—compensation management—and its part in the overall personnel programs of the organization. Develops through simulation exercises, group projects, lectures, and cases an analysis of reward systems as supportive mechanisms of management and the formulation of compensation policy and implementation of compensation systems. *Prereq.* Middler standing.

HRM 1349 Selection and Assessment of Employees**4 QH**

Examines three influences of employee selection and testing: the legal aspect of selection, where the greatest uncertainty is found; the influence of industrial psychology on selection and decision-making techniques; and the area of personnel practices itself, that is, the methods employers find effective in coping with legal requirements. Covers basic issues and procedures such as EEO, decision strategies, and the utility and evaluation of selection and appraisal systems. *Prereq. Middler standing.*

HRM 1350 Skills of Leading and Managing**4 QH**

Examines the evolving role of managers in improving organization effectiveness. Examines the emerging nature of the work force, new technology and human resource alliances, linking human resources with business strategy, managerial applications of system thinking, effecting continuing organizational change, and building learning organizations. *Prereq. HRM 1431 and HRM 1432, or HRM 1433.*

HRM 1432 Organizational Behavior**4 QH**

Explores the effects of individual, interpersonal, group, and leadership factors on human behavior. Also explores managerial applications of behavioral and social science concepts, including job design, job satisfaction, performance appraisal, supervision, career dynamics, and organizational change. Emphasizes helping the student develop skills in dealing with the human side of enterprise. *Prereq. Middler standing. (Not open to College of Business Administration students.)*

HRM 1433 Organizational Behavior and Design**8 QH**

Covers the material from HRM 1431 and HRM 1432. The structure and dynamics of the complex organization are examined, focusing on the design of the organization and its basic subsystems. The effects of individual, interpersonal, group, and leadership factors on human behavior are also examined. Students have the opportunity to explore how organizational structures help shape human behavior and to develop skills in dealing with the human side of enterprise. *Prereq. Middler standing.*

HRM 1519 Leadership**4 QH**

Studies the leadership function in a variety of organizational settings. Uses a contingency approach to help students explore a range of possible leadership behaviors, relating the appropriateness of a particular style to a number of situational factors. Readings provide an opportunity to explore several contingency theories of leadership; cases allow for the application of these models; and videotaped role playing and self-assessment techniques permit students to evaluate their own leadership style. *Prereq. Middler standing.*

HRM 1581 Managerial Skills Seminar**4 QH**

Studies and develops specific behavioral and interpersonal skills critical for managerial success, particularly those most vital early in management careers, in a seminar/workshop format. Uses introspective and experiential exercises and role plays extensively and discusses specific work assignments. *Prereq. Middler standing.*

HRM 1585 Managing Human Resources: The Legal Environment**4 QH**

Studies the recent legal developments affecting the management of human resources. Examines recent state and federal laws that will influence managerial policies and practices in areas such as employment testing, hiring and promotion, controlling unemployment compensation and Worker's Compensation claims, and responding to OSHA and ERISA regulations. *Prereq. Middler standing.*

HRM 1587 Training and Development**4 QH**

Explores contemporary methods for developing and delivering training programs that enhance performance at both an individual and organizational level. Emphasizes practical application in the areas of need analysis, curriculum design, learning objectives, program development, materials preparation, training interventions, course evaluation, and facilitation skills. Gives students the opportunity to develop, conduct, and evaluate training sessions. *Prereq. HRM 1433.*

HRM 1591 Independent Study**1 QH**

Allows a student who has received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study will take place. A copy of the final report prepared by the student will be presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from area coordinators.

HRM 1592 Independent Study**2 QH**

Same as HRM 1591.

HRM 1593 Independent Study**3 QH**

Same as HRM 1591.

HRM 1594, HRM 1595, HRM 1596, HRM 1597 Independent Study**4 QH each**

Same as HRM 1591.

HRM 1760 International Labor Relations Systems**4 QH**

Analyzes labor relations systems of selected countries in comparison with that of the United States. Also studies the political, cultural, and economic forces that shaped these systems. Gives special attention to such international institutions as multinational companies and the EEC. Cases, readings, and projects assigned. *Prereq. Middler standing.*

HRM 1762 Managing People in International Settings**4 QH**

Covers basic issues in human resources management relevant to managing in international and cross-cultural environments. Examines selection and training of personnel for work in multicultural environments, managing the international employee in the United States and abroad, cross-cultural communication, international environments, special issues of concern to small business, and change in multinational companies. *Prereq. Junior standing.*

HRM 1814 Managing Ethical Dilemmas in Business (Honors)**4 QH**

Considers the ethical dilemmas that arise for managers whenever individual goals collide with larger responsibilities to the community, co-workers and employees, and the organizations to which they belong. Aims to increase awareness of, ability to analyze, and skills to cope with the often conflicting responsibilities and alternatives that underlie managerial dilemmas. Uses a seminar approach to explore managerial dilemmas across functional areas and to develop applied case scenarios. *Prereq. Honors participation or permission of instructor.*

HRM 1891 Honors Thesis in Progress

HRM 1892 Honors Thesis

HRM 1893 Honors Thesis in Progress

HRM 1894 Honors Thesis

0 QH

8 QH

0 QH

12 QH

International Business Administration

INB 1338 Introduction to International Business

4 QH

Focuses on the cultural, economic, and political aspects of domestic and foreign environments and their effect on the international operations of business firms. Topics include the principles, patterns, and potential of international trade and investments; the development of management strategies for international businesses; and the organization and management of the firm's international operations. *Prereq. Middler standing.*

INB 1352 Seminar in International Business

4 QH

Applies the concepts and skills acquired in other international and domestic courses. Focuses on solving managerial problems in international and multicultural contexts. Uses case analysis to focus on business strategy and policy related to international operations. Requires significant class participation, written analysis, and understanding of current issues. *Prereq. INB 1338 and senior standing.*

INB 1731 Cultural Aspects of International Business

4 QH

Covers, from a managerial perspective, issues that arise when a firm moves from its home country to a host country that has a different national culture. Focuses on United States-based firms that operate abroad. Also considers what happens to other nation's firms operating in the United States and in third-country environments. Analyzes how "corporate culture" evolves in the context of national culture and the impact on managers. *Prereq. Middler standing.*

INB 1735 Import and Export Management

4 QH

Covers the principles and practices of international trade through import and export. Focuses on management aspects and explores details required to engage all aspects of international trade. Topics include government regulations, transportation, insurance, marketing, and finance.

Management

MGT 1115 Introduction to Business

4 QH

Introduces the basic functions of management, team-taught by faculty from all areas of the College of Business Administration. Examines academic choices and career opportunities in business.

MGT 1345 Legal Aspects of Business

4 QH

Examines the legal aspects of business transactions and business relationships involving contracts and sale of goods under the Uniform Commercial Code, as well as product liability and agency law.

MGT 1350 Advanced Strategic Management

4 QH

Emphasizes the systems designed by managers to facilitate organizational change and effective strategy implementation. Develops a framework for understanding and managing the complex interrelationships that exist among strategy, structure, culture, control systems, and management style, and their impact on the organization's performance, through readings and case discussions. Includes exploration of current strategic management issues, such as global expansion, corporate renewal, quality assurance, innovation and technology, strategic alliances, project management, and integrating functional perspectives, through discussion of current and classic strategic management writings. *Prereq. MGT 1450.*

MGT 1446 Managing Social Issues

4 QH

Focuses on the legal, social, ethical, and economic influences as well as domestic and international cultural factors affecting business. Treats various ways the manager can respond to these influences. Topics include the several possible models of the business and society relationship; the foundations of personal and managerial ethics; the business, government, and society interrelationships; ways the manager can address various stakeholder interests; and strategic and corporate public policy consequences of management's responses to specific social issues. *Prereq. Junior standing.*

MGT 1450 Business Policy

4 QH

Focuses on corporate strategy and its elements, including an analysis of the company, its resources, opportunities, environment, and decision makers. Emphasizes decision making and implementation of strategy while operating a company in the context of a business simulation. *Prereq. Senior standing.*

MGT 1572 Law of Wills, Trusts, and Estates

4 QH

Examines requirements of valid will, claims of and against estates; the administration of estates, both formal and informal; essential elements for the creation of a trust; kinds of trusts, including inter vivos and testamentary trusts; the rights, responsibilities, and liabilities of trustees; and the rights of beneficiaries. *Prereq. Middler standing.*

MGT 1574 Law in Society

4 QH

Provides students the opportunity to acquire a broad view of their legal rights, obligations, and responsibilities in their relations with others and with the state. Includes study of torts, such as assault and battery, trespass, negligence, slander, libel, and deceit, and crimes such as homicide, assault and battery, robbery, arson, larceny, and burglary. *Prereq. Middler standing.*

MGT 1575 Negotiations

4 QH

Focuses attention on the strategies and techniques employed in the negotiations process. Includes familiarization with related literature, student role-playing, and interaction with professionals involved in private and public sector negotiations.

MGT 1580 Intercultural Negotiation and Conflict

4 QH

Focuses on effective management in multicultural environments and the need for negotiating skills beyond basic bargaining tools. Considers such psychological and sociological factors as stereotyping, discrimination, biculturalism, intercultural conflict, cultural factors in negotiation, and cultural hegemony. Provides the opportunity to apply these and related ideas to such practical situations as negotiating relationships among intercultural groups, negotiating across cultures, and understanding relationships between competing cultures.

MGT 1591 Independent Study**1 QH**

Allows the student who has received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study will take place. A copy of the final report prepared by the student will be presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from area coordinators.

MGT 1592 Independent Study**2 QH**

Same as MGT 1591.

MGT 1593 Independent Study**3 QH**

Same as MGT 1591.

**MGT 1594, MGT 1595, MGT 1596, MGT 1597
Independent Study****4 QH each**

Same as MGT 1591.

MGT 1720 Labor Law**4 QH**

Helps acquaint the student with the many constitutional and legal problems involved in labor organizing, industrial relations, labor negotiations, labor contract enforcement, and dispute resolution. Examines cases for the legal principles underlying the common law, state and federal laws, and the constitutional questions of power and authority. Also considers the Sherman Act, Clayton Act, Norris-LaGuardia Act, and Labor Management Relations Act. *Prereq. Middler standing.*

MGT 1820 Independent Study (Honors)**4 QH**

Offers directed study toward fulfillment of Honors Program requirements and is open only to students who have been accepted into the Honors Program. Procedures for arranging the honors independent study are the same as those for MGT 1594.

MGT 1831 International Competitiveness in a Global Economy**4 QH**

Introduces students to the evolution and growing interdependence of the global economy, especially the increasing number of regional trading arrangements such as NAFTA, GATT, APEC, and Mercosur. Analyzes the international competitiveness issues addressed in such arrangements to show students how governments influence national and world economies as well as the global competitiveness of an individual corporation. Includes readings, case studies, and guest speakers. May entail one or two overnight field visits within the United States and/or Canada over a weekend. *Prereq. Honors participation or permission of instructor.*

MGT 1832 Managing Product Innovation in Large Companies (Honors)**4 QH**

Introduces conventional, single-product approaches to product development and then considers innovation from a series of broader managerial and technological perspectives, combining theory and applications. *Prereq. Honors participation or permission of instructor.*

MGT 1838 Corporate Renewal through New Product Development**4 QH**

Provides an overview of the key issues facing technology-based firms. Addresses the following challenges from the perspectives of both the small start-up and the large corporation seeking to renew itself: the threat of technological discontinuities for existing business; the renewal of product architectures; identifying

and understanding markets for new technologies; the linkage between design and manufacturing to achieve value cost advantage; and applications of product concepts to software, information products, and services. *Prereq. Honors participation or permission of instructor.*

MGT 1891 Honors Thesis in Progress**0 QH****MGT 1892 Honors Thesis****8 QH****MGT 1893 Honors Thesis in Progress****0 QH****MGT 1894 Honors Thesis****12 QH**

Management Science

MSC 1200 Business Statistics I**4 QH**

Studies statistics, which is the methodology concerned with data collection, analysis, and interpretation. Discusses the information that is generated by statistical methods and used for analyzing decisions in the face of uncertainty. Introduces fundamental concepts and methodology of statistics, probability distribution, estimation, and hypothesis testing. *Prereq. MTH 1114.*

MSC 1201 Business Statistics 2**4 QH**

Continues topics covered in MSC 1200. Includes chi-square tests, simple and multiple regression-correlation analysis, and elementary concepts of time series analysis. *Prereq. MSC 1200.*

MSC 1226 Introduction to Computer Applications in Business**4 QH**

Introduces personal computers with business applications, as well as microcomputers, spreadsheets, word processing, and databases. Covers the basic information systems concepts. Requires students to analyze a business case, applying their technology and problem-solving skills.

MSC 1330 Data Management**4 QH**

Builds on the functional skills learned in MSC 1226. Exposes students to the essentials of data management. Topics include database design, selection and use of a database software package, database administration security, privacy, and data recovery. *Prereq. MSC 1226.*

MSC 1332 Decision Support Systems for Business**4 QH**

Provides students with an understanding of the impact of computer-based tools on business decision making. Builds upon the computer literacy foundation established in MSC 1226. Covers decision support software such as graphics and expert systems on both mainframe and microcomputers. Gives students the opportunity to build a decision support system and create the supporting system documentation and user manual in a course project. *Prereq. MSC 1226.*

MSC 1335 Telecommunications and Networks**4 QH**

Reviews business telecommunications. Focuses on the design, use, and management of networks. Topics include telecommunications technology, network structures, and current telecommunication applications in business such as electronic mail, teleconferencing, and distributed applications. *Prereq. MSC 1226.*

MSC 1336 Business Programming**4 QH**

Provides students with experience in structured reasoning and programming. Builds upon the skills mastered in MSC 1330; utilizes an object-oriented language such as Microsoft Access Basic.

Gives students the opportunity to gain an appreciation for design, coding, debugging, and executing program modules. Emphasizes the design discipline required to create such modules and the productivity gain that can be realized by employing object modules of this type in a business setting. *Prereq.* MSC 1226, MSC 1330.

MSC 1341 Information Resource Management 4 QH

Examines the major organizational and managerial issues associated with managing the information resource focusing on three thematic components. Gives students the opportunity to assume a strategic viewpoint and consider using information to achieve competitive advantage, create new products or services, or to re-engineer the business; learn about using information technology to support the functional areas of the business such as finance, manufacturing, or human resources; consider issues related to managing information technology such as outsourcing IS applications, project management, and investing in new technology. *Prereq.* MSC 1226 and junior standing.

MSC 1342 Business Systems Integration 4 QH

Explores strategies for the functioning integration of information systems in both the office and the factory. Explores strategies for systems integration through a project requiring students to form companies, analyze their data needs, design and build a set of information systems, and recommend a strategy for data architecture integration. This is the capstone course for the MIS concentration. *Prereq.* MSC 1226, MSC 1330, MSC 1332, MSC 1335, MSC 1341. *Suggested* MSC 1336.

MSC 1433 Quantitative Models in Business 4 QH

Focuses on the construction of appropriate mathematical models (simplified representations or abstractions of reality) for managerial decision-making problems. Discusses criteria for selecting various stochastic and deterministic models. Covers decision trees, decision analysis, linear programming, and simulation. *Prereq.* MSC 1201.

MSC 1441 Operations Management 4 QH

Considers the productive system of an enterprise whereby inputs of technology, materials, personnel, and information are transformed into useful goods and/or services. Introduces the types of problems and issues encountered by the operations manager. Discusses various models and techniques but emphasizes problem formulation and managerial implications.

MSC 1553 Decision Analysis 4 QH

Focuses on the analysis of decision making, with particular emphasis on realistic problems under uncertainty. Aims to help improve the student's ability to make better decisions through a careful consideration of alternative courses of action and their consequences, relevant objectives, and the element of risk. Covers the basic components of decision problems, the concepts of risk and utility, decision trees, and value of information and multicriteria decision-making. *Prereq.* MSC 1201.

MSC 1566 Quality Management 4 QH

Examines the basic philosophy of quality and its management both in Japan and in the United States. Stresses the changing role of quality as an emerging strategic factor in the United States. Discusses managerial, behavioral, and statistical methods based on measurement for achieving quality. Introduces the student to various aspects of quality management relevant to lower, middle and upper level of management; quality control circles; quality and continuous process improvements; and the philosophy of

quality experts such as Deming, Juran, and Ishikawa. *Prereq.* MSC 1200, MSC 1201, and MSC 1441.

MSC 1591 Independent Study 1 QH

Allows the student who has received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study will take place. A copy of the final report prepared by the student will be presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from area coordinators.

MSC 1592 Independent Study 2 QH

Same as MSC 1591.

MSC 1593 Independent Study 3 QH

Same as MSC 1591.

MSC 1594, MSC 1595, MSC 1596, MSC 1597 Independent Study 4 QH each

Same as HRM 1591.

MSC 1701 Business Statistics 2 (Honors) 4 QH

See course description for MSC 1201.

MSC 1826 Business Forecasting (Honors) 4 QH

Focuses on analyzing data using statistical models from various functional areas of business. Students prepare reports based on actual data that emphasize forecasting.

MSC 1828 Strategies for Environmentally Responsible Organizations 4 QH

Discusses how management decisions regarding product design, production methods, facility location and distribution channels, and service policies may have direct environmental consequences. Focuses on the operational strategies and tactics in manufacturing and non-manufacturing organizations that deal with environmental problems. Reviews federal and state environmental policy and legislation and examines the specific actions of producers and service producers. *Prereq.* Honors participation or permission of instructor.

MSC 1891 Honors Thesis in Progress 0 QH

MSC 1892 Honors Thesis 8 QH

MSC 1893 Honors Thesis in Progress 0 QH

MSC 1894 Honors Thesis 12 QH

Marketing

MKT 1331 Marketing Management 4 QH

Provides training in marketing decision making. Uses case studies simulating actual business settings to help students develop analytical abilities and sharpen their communications skills. Covers topics that range from techniques used to analyze a market to the development of a total marketing strategy (product policy, pricing policy, promotion policy, and distribution policy). *Prereq.* MKT 1435 and middler standing.

MKT 1341 Marketing Research	4 QH	MKT 1545 New Product Development	4 QH
Focuses on the survey research process and the analysis of data using "canned" computer programming routines. Covers topics such as problem definition, research design, sampling techniques, questionnaire development, data collection methods, and data analysis. Students expected to work on group projects. Requires no previous computer experience. <i>Prereq. MKT 1331 and MSC 1201.</i>		Focuses on the challenges and decisions managers face in creating, developing, launching, and managing new products and services. Special emphasis is given to the stages of the new product development process, the information needs in each stage, and approaches for gathering needed information. <i>Prereq. MKT 1331.</i>	
MKT 1351 Competitive Strategy	4 QH	MKT 1553 Foundations of Consumer Behavior	4 QH
A capstone marketing course, required of all students with a marketing concentration. Focuses on the formulation of marketing strategy at a policy level and its implementation in a dynamic environment. <i>Prereq. MKT 1331 and senior standing.</i>		Helps students develop an understanding of consumer attitudes and behavior processes as the basis of the design of marketing problems. Considers economic and behavioral models of consumer behavior and underlying behavioral theories and concepts. <i>Prereq. MKT 1331 and middler standing.</i>	
MKT 1435 Introduction to Marketing	4 QH	MKT 1591 Independent Study	1 QH
Consists of lectures, readings, and small-group discussions on the role of marketing in contemporary society, in the business enterprises, and in the nonprofit organization. Considers the planning, operation, and evaluation of marketing and promotional efforts necessary to the effective marketing of consumer and industrial products and services in both profit and nonprofit organizations. <i>Prereq. Middler standing.</i>		Allows the student who has received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study will take place. A copy of the final report prepared by the student will be presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from area coordinators.	
MKT 1501 Introduction to Retailing	4 QH	MKT 1592 Independent Study	2 QH
Explores the range of retail firms that make up the retailing industry, from large mass merchandisers to small specialty outlets. Examines the functions, practices, and organizations of various store types. Considers such topics as current issues, career opportunities, the environment of retailing and retailing's role in the economy. <i>Prereq. Middler standing.</i>		Same as MKT 1591.	
MKT 1503 Retail Merchandising and Control	4 QH	MKT 1593 Independent Study	3 QH
Examines the concepts and techniques of store operations and merchandise management. Considers topics such as calculating and planning markups and markdowns, pricing, inventory control, stock turn, open-to-buy, profitability analysis, and expense control. <i>Prereq. MKT 1435 or permission of instructor.</i>		Same as MKT 1591.	
MKT 1523 Advertising Management	4 QH	MKT 1594, MKT 1595, MKT 1596, MKT 1597 Independent Study	4 QH each
Focuses on the management of the advertising function in relation to a firm's overall marketing objectives. Approaches the subject from the perspective of the user of advertising (for example, the product manager and the marketing manager). Uses case studies and text material to help the student develop decision-making skills. <i>Prereq. MKT 1331 and middler standing.</i>		Same as HRM 1591.	
MKT 1531 Sales Management	4 QH	MKT 1735 Introduction to Marketing (Honors)	4 QH
Provides training in effective selling skills and how to manage accounts. Discusses how customers buy products and services and how this relates to a company's sales process: prospecting accounts, making sales presentations, handling customer objections, closing sales, and post-sale servicing of accounts. Also covers current approaches such as relationship and partnership selling. <i>Prereq. MKT 1331 and middler standing.</i>		Explores the role of marketing in contemporary society, business enterprises, and nonprofit organizations through lectures, readings, and small group discussions. Considers planning, operating, and evaluating marketing and promotional efforts that are necessary to effectively market consumer and industrial products and services in both profit and nonprofit organizations. <i>Prereq. Middler standing and honors participation.</i>	
MKT 1542 Industrial Marketing	4 QH	MKT 1760 International Marketing	4 QH
Examines the marketing of products where business firms are the potential customers. Upperclass elective, open to juniors and seniors. <i>Prereq. MKT 1331 and middler standing.</i>		Introduces those aspects of marketing that are unique to international business within the framework of traditional functional areas of marketing. Focuses on the environment and the modifications of marketing concepts and practices necessitated by environmental differences. Includes such topics as cultural dynamics in international markets, political and legal environmental constraints, educational and economic constraints, international marketing research, international marketing institutions, and marketing practices abroad. <i>Prereq. MKT 1331 and middler standing.</i>	
		MKT 1891 Honors Thesis in Progress	0 QH
		MKT 1892 Honors Thesis	8 QH
		MKT 1893 Honors Thesis in Progress	0 QH
		MKT 1894 Honors Thesis	12 QH

Logistics and Transportation

- TRN 1333 The Domestic Transportation System** 4 QH
Examines the structure, operations, and problems of the several modes of transportation, and outlines the government role in regulation and promotion. Also highlights the interaction between carriers and shippers in the transportation marketplace.
- TRN 1335 Current Issues in Logistics and Transportation** 4 QH
Identifies important contemporary issues and problems in logistics and transportation and examines their nature and significance. Explores alternative approaches to resolving such problems by analyzing various options and their implications.
- TRN 1344 Business Logistics** 4 QH
Analyzes the role and activities of those involved in corporate logistics decision making. Emphasizes the importance of transportation planning, inventory control, warehousing, customer service standards, and location decisions in the design and operation of distribution systems.
- TRN 1352 Advanced Problems in Logistics and Transportation** 4 QH
Identifies and examines important logistics and transportation issues that are of strategic importance to logistics professionals and carrier managers. Emphasizes the decision-making processes employed by top-level executives in the field. Focuses on the policy formulation process.
- TRN 1353 Seminar in Transportation and Logistics** 4 QH
Focuses on a limited number of advanced transportation/logistics topics. Offers students experience with business and government through individual research topics selected for class presentation/discussion. *Prereq.* Senior standing or permission of instructor.
- TRN 1514 Carrier Management** 4 QH
Examines the perspective of those involved in managing the several modes of transportation. Emphasizes the decision-making process related to such issues as carrier financing, pricing, labor relations, and equipment selection.
- TRN 1528 Urban Transportation** 4 QH
Focuses on the movement of people and freight in and around metropolitan areas. Examines the role of transit managers in planning, implementing, and operating mass transit systems. Also outlines how various governmental units participate in financing and regulating urban transportation.
- TRN 1591 Independent Study** 1 QH
Allows the student who has received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study will take place. A copy of the final report prepared by the student will be presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from area coordinators.
- TRN 1592 Independent Study** 2 QH
Same as TRN 1591.
- TRN 1593 Independent Study** 3 QH
Same as TRN 1591.
- TRN 1594, TRN 1595, TRN 1596, TRN 1597 Independent Study** 4 QH each
Same as TRN 1591.
- TRN 1721 Labor/Management Issues in Transportation** 4 QH
Focuses on labor in the transportation industries. Examines trends in employee compensation, productivity, bargaining patterns, and influence of government policies on labor/management issues.
- TRN 1760 International Transportation and Logistics Management** 4 QH
Analyzes the managerial activities of logistics planning and operations in multinational firms. Focuses on contemporary issues that affect the design of international logistics systems, and examines the current and future status of ocean and air transportation in international trade and development.
- TRN 1891 Honors Thesis in Progress** 0 QH
- TRN 1892 Honors Thesis** 8 QH
- TRN 1893 Honors Thesis in Progress** 0 QH
- TRN 1894 Honors Thesis** 12 QH

Computer Science

COM 1100 Fundamentals of Computer Science

4 QH

Introduces computers and computer programming. Studies basic concepts of a high-level language such as data types, variables, assignment, expressions, statements, and input/output. Surveys structured programming tools including flow control constructs, procedures and functions, parameters, local variables, and user-defined data structures. Discusses the string and array data structures in detail. Introduces graphics and animation. Emphasizes the systematic design of programs using structured components.

COM 1101 Algorithms and Data Structures 1

4 QH

Introduces algorithms, data structures, abstraction, and modularization. Discusses elementary sorting and searching. Studies data structures such as records and combinations of arrays and records, external text and binary files, linked lists, stacks and queues. Introduces recursion as a technique for the rapid design of complex algorithms. *Prereq.* COM 1100 or equivalent.

COM 1102 Functional Programming and Its Applications

4 QH

Introduces the fundamental concepts and applications of functional programming and their relationship to computer science. Reviews basic ideas underlying symbolic information processing and the role of LISP in this context. Covers applications selected from artificial intelligence, programming language design and implementation, procedural and data abstraction, and development of data-driven programs. *Prereq.* COM 1101.

COM 1105 Computer Science and Its Applications

4 QH

Provides an opportunity for students of all majors to understand and experience the computer science field and to become informed and intelligent users of its tools. Explores using the computer as a fundamental component of the problem-solving process. Discusses the basic principles. Provides hands-on experiences with word processors, spreadsheets, and database management systems. *Not open to computer science or business administration majors.*

COM 1115 Introduction to Computers 1

1 QH

Introduces students to personal computers and how they can enhance productivity. Discusses the basic operations and style of interaction on PCs. Teaches word processing. Introduces drawing and painting programs for creating presentation graphics. *Students may take either COM 1105 or the sequence COM 1115, COM 1116, and COM 1117, but not both. Not open to computer science or business administration majors.*

COM 1116 Introduction to Computers 2

1 QH

Discusses using spreadsheets for data analysis. Describes how to create charts and graphs for data presentation. Introduces simple data management tasks. *Prereq.* COM 1115 or equivalent. *Students may take either COM 1105 or the sequence COM 1115, COM 1116, and COM 1117, but not both. Not open to computer science or business administration majors.*

COM 1117 Introduction to Computers 3

1 QH

Discusses the design and use of relational databases for sophisticated data management tasks. Utilizes packages for statistical and graphic analysis of data. *Prereq.* COM 1115 and COM 1116 or equivalent. *Students may take either COM 1105 or the*

sequence COM 1115, COM 1116, and COM 1117, but not both. Not open to computer science or business administration majors.

COM 1121 Computer Science Overview 1

1 QH

Introduces students to Northeastern and the Computer Science program. Discusses general issues relevant to college survival such as goals, values, standards, and time management. Describes the various subfields in computer science in relation to curriculum planning and undergraduate degree requirements. Rapidly introduces several application packages such as word processing, spreadsheets, and drawing programs. Emphasizes the use of spreadsheets as a general problem-solving tool. *Prereq.* Computer science majors only.

COM 1122 Computer Science Overview 2

1 QH

Introduces the UNIX operating system. Helps students develop fluency in UNIX through hands-on use of such UNIX utilities as emacs, mail, mosaic, newsgroups, grep, tex/latex, shell commands, and other topics. *Prereq.* Computer science majors only.

COM 1130 Computer Organization and Design

4 QH

Discusses how a computer system works and why it performs as it does. Topics include assembly language: programs, call/return, stack frames; arithmetic: representations and algorithms; digital design: an implementation of an RISC subset; and organization: the memory hierarchy. *Prereq.* COM 1101.

COM 1201 Algorithms and Data Structures 2

4 QH

Introduces complex data structures and the corresponding algorithms for manipulation. Examines trees; binary search; priority queues, heaps, and heapsort; and quicksort. Introduces analysis of algorithms. Surveys graphs; depth-first and breadth-first search; shortest path and minimal spanning tree; sets, union, and find; hashing; and balanced trees. *Prereq.* COM 1101 and MTH 1137.

COM 1204 Object-Oriented Design

4 QH

Introduces the philosophy and methodology of object-oriented design utilizing a modern, full-featured, object-oriented programming language. Considers the concepts of encapsulation class, template instance, data members, and function members, constructors, destructors, and overloading of functions and operators. Introduces class libraries as the foundation for systematic software design. Applies object-oriented design to small and medium scale projects and compares object-oriented methods to other paradigms of software design. *Prereq.* COM 1101 or permission of the instructor.

COM 1205 Software Design and Development

4 QH

Presents the latest ideas and techniques in software methodology and provides a means for students to apply these techniques. Students, working in groups, will be expected to design, implement, test, and document a large software project. *Prereq.* COM 1201, COM 1204.

COM 1230 Introduction to UNIX Tools

4 QH

Introduces the essentials of UNIX programming via the use of high-level programming languages and tool kits. Topics include the UNIX shell and essential utilities, perl, tcl/tk, python, and high-level TCP/IP networking basics. Provides students with an

opportunity to learn the tools and programming languages available that will help them make the best use of UNIX and UNIX development.

COM 1315 Database Design

4 QH

Focuses on designing a database for use in a relational database management system. Uses the entity-relationship model and normalization on example problems. Presents the SQL language. Topics may include the network model, the hierarchical model, or the object-oriented model. Nonmajors with programming experience in PASCAL or C are welcome. Requires implementing a database schema and short application program on a commercial database management system. *Prereq. COM 1101 or programming experience in a high-level language.*

COM 1317 Transaction Processing Systems

4 QH

Focuses on the concepts and practice of modern transaction processing systems in a distributed setting. Describes the overall architecture of systems such as TP monitor, recovery manager, log manager, and lock manager. Discusses the principles of DO/UNDO/REDO logging such as the write-ahead log rule and the force log-on-commit rule. Describes compensation log records, checkpoint and restart recovery procedures, two-phase commit, lock tables, granularity of locking, and two-phase locking. *Prereq. COM 1310 and COM 1315.*

COM 1330 Operating Systems

4 QH

Studies the process model of computing; interprocess communication: the client-server model; input and output: hardware and device drivers; and file systems: safety and security. *Prereq. COM 1201, COM 1130.*

COM 1335 Distributed Operating Systems

4 QH

Covers distributed operating systems; communication: ATM, client-server, remote procedure call, processors, processes, and threads; distributed file systems; security; and uses case studies. Includes programming on workstations in labs. *Prereq. COM 1330.*

COM 1337 Computer Communication Networks

4 QH

Explores data networking. Focuses on concepts, technology, and implementation issues. Discusses distributed system requirements, network architectures, OSI model, communication protocols, routing algorithms, local area networks, public data networks, vendor network architecture, PC networks, standards, internetworking, network management, and performance issues. Uses examples from real networks (such as IBM, SNA, DEC's DECnet, Ethernet, Token Ring, and X.25) to reinforce theory. Requires using real networks and designing and implementing communication protocols. *Prereq. COM 1330.*

COM 1350 Automata and Formal Languages

4 QH

Covers finite-state machines and regular expressions; context-free grammars; properties and decidability problems of regular and context-free languages; pushdown automata; pumping theorems for regular and context-free languages; Turing machines, Church's thesis, and the halting problem; and applications to compilers, artificial intelligence, and pattern recognition. *Prereq. COM 1201 and MTH 1137.*

COM 1355 Compiler Design I

4 QH

Implements lexical analyzers and parsers as specified by regular expressions and context-free grammars. Emphasizes the use of LALR(1) or LL(1) parser generators. Covers basic code genera-

tion. Uses a hands-on approach, including either a sequence of programming assignments or a project. *Prereq. ECE 1178 and COM 1350.*

COM 1358 Analysis of Programming Languages

4 QH

Covers run-time behavior of programming languages; interpreters; static and dynamic scoping; parameter-passing mechanism; implementation of functions and recursion; and features of current languages and their implementation. *Prereq. COM 1102.*

COM 1370 Computer Graphics

4 QH

Focuses on characteristics and programming of graphics output devices. Presents basics point and line drawing, two-dimensional displays, and clipping and windowing. Surveys pictures: data structures and display file organization; and interaction: graphical input and external events-operating system considerations. Includes some three-dimensional drawing. *Prereq. COM 1201 and MTH 1301.*

COM 1390 Algorithms

4 QH

Introduces the basic principles and techniques of analyzing algorithms. Topics include algorithms on sorting, searching, graphs, and digraphs (such as minimal spanning tree, shortest path, depth-first search, components of a graph); and methods involving string matching, polynomials and matrices. Considers fast Fourier transform and the concept of N P-complete problems. *Prereq. COM 1201, MTH 1125, MTH 1137, and MTH 1301.*

COM 1400 Data Parallel Computing

4 QH

Introduces the basic concepts of parallel computer architectures, network topologies, and data parallel programming. Emphasizes SIMD machines with mesh or hypercube interconnection networks of workstations. Studies fundamental data structures and data parallel algorithms for matrix operations, fast fourier transforms, and graph and geometric computations for complexity and performance characteristics. Requires a significant amount of programming to complete course assignments.

COM 1410 Artificial Intelligence

4 QH

Focuses on the required capabilities for a computer to be intelligent by studying current methods for automated understanding, problem solving, and learning. Students perform experiments with semantic nets, logical deduction systems, evidential reasoning systems, and neural nets. *Prereq. COM 1102, COM 1201.*

COM 1420 Principles and Methods in Interactive Systems Design

4 QH

Introduces principles of computer-human interface (software) design, and methodologies of implementation, evaluation, and research in computer-human interaction. Topics include user psychology, dialog styles (menu interfaces, command languages, icons, windows), screen layout and design, input and output devices (mouse, touchscreen, keyboard, voice technology), error handling/reporting and system response time, user documentation, and "intelligent" interfaces. Traces techniques for implementing software-human interfaces, and methodologies for testing and assessing the "usability" of interactive systems.

COM 1600 Computer Science Project

4 QH

Presents the latest ideas and techniques in software methodology and provides a means for students to apply these techniques. Students, working in groups, will be expected to design, implement, test, and document a large software project. *Prereq. COM 1102, COM 1201, and COM 1355.*

COM 1621 Computer Science Seminar**1 QH**

Prepares students in methods of oral presentation of a topic in computer science. Describes techniques in preparation of overheads and other visual aids and their appropriate and effective use. Requires students to give a 20–30 minute oral presentation with overheads on a topic of their choice. *Prereq. Computer science seniors only.*

COM 1721, COM 1722, COM 1723**1 QH each****Freshman Honors Seminar 1, 2, and 3**

Offers a seminar course for freshman honors students in computer science and for freshman honors students in other majors who are concurrently taking COM 1100, COM 1101, or COM 1201 respectively, or who have completed these courses. Introduces a variety of topics that extend the material in the standard freshman computer science courses or go beyond the scope of these courses. *Prereq. Enrollment in the honors program or permission of the instructor.*

COM 1770 Computer Science Seminar (Honors)**4 QH**

Offers a capstone course for computer science honors students. Exposes students to a variety of computer science topics of current interest, and provides an opportunity to improve skills in presenting technical material. Requires students to prepare a one hour presentation of professional quality on a topic of interest in computer science. Requires the student to write paper on the same topic.

COM 1777 Honors Adjunct Computer Science**1 QH**

Allows honors students who do not have an honors section to do honors work in one of the computer science elective courses while enrolled in the regular course.

COM 1800 Directed Study in Computer Science**4 QH**

Provides students strong in computer science and related sciences a chance to develop the art and skill needed to work independently and creatively in computer science. Programs of directed study, held one or more quarters, are available for highly motivated students who wish to explore in depth special topics in computer science. Directed study can be used as an opportunity to examine familiar material in fresh ways or to explore new material that is not offered in formal courses. *Prereq. Permission of the instructor; may be repeated for credit.*

COM 1810 Topics in Computer Science**4 QH**

Focuses on an advanced topic in computer science to be selected by the instructor. *Prereq. Permission of the instructor.*

Cooperative Education

COP 1135 Professional Development for Journalists

1 QH

Provides current career information in the field of journalism primarily through outside speakers. Prepares journalism students for field experience. Employs current preferred learning and working style models for self exploration.

COP 1180 Career Decision-Making

4 QH

Focuses on needs and concerns of students who may be undecided or uncertain about their academic major or career direction.

Emphasizes self-assessment, career exploration, decision making, and goal setting. *Prereq.* Freshmen or sophomores in any major or permission of instructor.

COP 1220 Working in the United States

4 QH

Helps international students in their freshman through middle years compete more effectively for cooperative education positions in the United States and assists them in their cultural transition into the American work force. Considers work-oriented cross-cultural issues, the American work ethic, skills development, resume writing, and interviewing techniques. *Prereq.* International students in first or second year in the United States, or permission of instructors.

COP 1314 Life/Career Planning

4 QH

Focuses on career exploration, self-assessment, job-search techniques, and networking. Requires students to prepare a professional resume, to participate in videotaped mock interviews, to research careers, and to investigate graduate and professional schools. *Prereq.* Junior or senior standing or permission of instructor.

COP 1353 Professional Development for Education

1 QH

Examines career development and career management issues of teaching professionals. Discusses important components of the after-graduation job search process, and utilizes advice from professionals in the field. Examines a number of current issues relating to the working conditions of teachers, such as the role of the teachers' union, teacher certification and graduate school, career issues for women, and alternative careers in education.

COP 1390 Community Service Learning

4 QH

Provides an introduction to service learning methodology as a way of teaching and learning for lifelong exploration of questions of civic responsibility, multicultural perspectives, societal norms, individual/group empowerment, and values clarification. Students will have the opportunity to explore the relationship of community service to academic study and career decision making.

Criminal Justice

CJ 1101 Administration of Criminal Justice

4 QH

Surveys the contemporary criminal justice system from the initial contact with the offender through prosecution, disposition, incarceration, and release to the community. Emphasizes major systems of social control: police, corrections, juvenile justice, mental health systems, and their policies and practices relative to the offender. Maintains balanced study by providing legal, empirical, and sociological materials.

CJ 1112 Critical Issues in Criminal Justice

4 QH

Introduces students to the major issues and ethical considerations facing criminal justice and criminology today. Discusses six to eight major critical, moral, and ethical issues. Considers such core topics as the death penalty, abortion, euthanasia, abolition of the insanity plea, victimless crimes (prostitution, drug abuse, gambling), and gun control. Presents these issues in the format of pros and cons; involves student presentations or debates.

CJ 1151 Introduction to Law and the Legal Process 1

4 QH

Provides an introduction to the law and the legal system of the United States. Sets forth the fundamentals of our legal process and provides a summary description of both the private and public law system. Presents an overview of the traditional structure, as well as the basic principles of law.

CJ 1152 Introduction to Law and the Legal Process 2

4 QH

Continues the material presented in CJ 1151. Introduces basic tort and contract principles, administrative law, and governmental regulation of business, topics of particular concern to criminal justice professionals in both the public and private sectors, as well as to those students concentrating in legal studies. *Prereq.* CJ 1151 and CJ 1252.

CJ 1201 Criminology

4 QH

Introduces the major theories of crime causation developed over the past two centuries. Explores the scope and nature of the current crime problem in the United States. Examines the characteristics of specific criminal behavior such as violent crime, property crime, organized crime, white-collar crime, and public order crime.

CJ 1251 Introduction to Criminal Law

4 QH

Deals with the area of criminal responsibility, some of its limitations, and certain modifications substantially affecting it. Requires an ability to express in writing both the knowledge of a particular concept and the ability to identify it in a complex fact pattern and discuss its implications and ramifications.

CJ 1252 Criminal Due Process

4 QH

Focuses on a historical evaluation of the Fourteenth Amendment and its use in making rights prescribed under the Bill of Rights applicable to the individual states. Also details the inherent problems of the Fifth and Sixth Amendments, including the effect of their implications on such matters as police practices, illegal search and seizure, and right to counsel. Expects students to be familiar with basic concepts as well as changing interpretations so they can cite cases that may stand as precedents for conclusions they draw. *Prereq.* CJ 1251.

CJ 1253 Introduction to Criminal Courts

4 QH

Examines the role of criminal courts in the United States, the structure and organization of the court system, and the flow of

cases from arrest to conviction. Focuses on the key actors in the courtroom—prosecutors, defense attorneys, judges, and court clerks—and the decision-making processes in charging, setting bail, pleading guilty, going to trial, and sentencing. Addresses prospects for reforming courts. *Prereq.* CJ 1251 and CJ 1252.

CJ 1254 Civil Liability in Criminal Justice

4 QH

Studies the contemporary problems of civil liability affecting the criminal justice professional. Reviews cases involving police, security, probation, parole, and corrections personnel to help students understand and appreciate the legal factors, public policy issues, and methods of reducing the risk of civil liability. *Prereq.* CJ 1251 and CJ 1252.

CJ 1255 Introduction to Juvenile Law

4 QH

Introduces the way society responds to juvenile offenders. Topics studied may include important legislation, fundamental case law, behavioral research studies, philosophy, history, delinquency, abuse and neglect, transfers and waivers, status offenses, and comparative law. Students may be required to observe actual juvenile cases in the Massachusetts Juvenile Court. *Prereq.* HCJ 1252 and junior or senior only.

CJ 1301 Introduction to Security

4 QH

Examines the organization and administration of security and loss prevention programs in industry, business, and government. Emphasizes the protection of assets, personnel, and facilities and focuses on the relations between security organizations and government agencies.

CJ 1302 Theories of Investigation

4 QH

Examines the commonalities and differences between criminal and non-criminal investigations, using various sources of information, and legal constraints imposed on investigators. Studies how forensics helps investigators in criminal investigations. Discusses interviewing techniques, report writing, and giving testimony.

CJ 1311 White-Collar Crime

4 QH

Gives the student a basic understanding of white-collar crime. Covers such topics as the nature and extent of white-collar crime, the social-psychologic makeup of white-collar crime, typologies, current efforts directed toward controlling it, and the interagency and jurisdictional problems and the benefits of cooperation.

CJ 1312 Organized Crime

4 QH

Examines the myths and realities of what is termed organized crime. Discusses the nature of organized crime and factors that contribute to it, as well as measures taken by society to curb its activities. Addresses the impact of organized crime on American society and its implications, both economic and political. Analyzes the characteristics of organized criminal enterprises and the variety of such groups operating in the United States as well as on the international level.

CJ 1314 Security Management and Supervision

4 QH

Deals with the roles and responsibilities of the security manager. Gives special attention to the responsibilities of planning, organizing, staffing, directing, controlling, representing, and innovating. Explores the manager's responsibility in professionalizing security and other relevant issues. *Prereq.* CJ 1301 or equivalent.

- CJ 1318 Terrorism** 4 QH
Attempts to give the student an understanding of what terrorism is and why it has become so popular. Includes the role of news media, political consequences of terrorism, the military as a resource, and the role of the hostage.
- CJ 1319 Legal Aspects of Security Management and Operations** 4 QH
Provides a comprehensive examination of the legal environment and issues affecting security operations and management. Analyzes elements of criminal, civil, property, regulatory, and business law from the perspective of organizational security management concerns. Includes legal basis of security practices, civil liability, corporate security, investigations, labor law, industrial espionage, governmental security issues, and other relevant topics.
- CJ 1401 Policing a Democratic Society** 4 QH
Gives an understanding of the role and function of policing in a modern democratic society. Examines contemporary American policing in light of its Anglo-Saxon roots, and compares it to policing in other Anglo-Saxon countries (such as Canada and Australia), and other modern police systems. Examines police in light of contemporary major issues including race, index crime, drugs, disorder, conflict, and riot. Examines the contemporary shift from reform (professional) to community and problem-oriented policing.
- CJ 1411 Police Strategy** 4 QH
Examines the current organizational strategy of American police, their goals and mission, and the resources and tactics they adopt to pursue those goals. Emphasizes the authority and resources granted to police; police function, organization, and administration; the demand for police services; the relationship of police to their environment; police tactics; and the outcome for which police strive. Focuses on police accountability and effectiveness. *Prereq. CJ 1401.*
- CJ 1424 Seminar in Policing** 4 QH
Specific topic in policing to be announced. *Prereq. CJ 1401, CJ 1411, and junior standing or above.*
- CJ 1426 Topics in Policing** 4 QH
Specific topic in policing to be announced. *Prereq. Junior standing or above.*
- CJ 1427, CJ 1428, CJ 1429, CJ 1430 Topics in Criminal Justice** 4 QH each
Specific topics in criminal justice to be announced. *Prereq. Middler standing or above.*
- CJ 1453 Criminal Justice Research Methods** 4 QH
Examines basic concepts in conducting criminal justice research. Students will become familiar with research techniques that are necessary for systematic analysis of the criminal justice system, offenders' behavior, crime trends, program effectiveness, problem analysis, etc. Requires that students actively pursue such techniques as research interviewing, data coding, and preliminary analysis in and outside of class. *Prereq. MTH 1010 or equivalent.*
- CJ 1454 Criminal Justice Statistics** 4 QH
Focuses on the use of statistics with special emphasis on criminal justice applications and the analysis of criminal justice data. Covers basic descriptive statistics, including levels of measurement, measures of central tendency, and measures of variability. Introduces the student to inferential statistics, including the normal curve, sampling error and confidence intervals, hypothesis testing, chi-square, and correlation. *Prereq. H CJ 1453.*
- CJ 1501 Evidence 1** 4 QH
Provides students the opportunity to develop their understanding of the manner in which legal issues and disputes are resolved by trial. Focuses on the manner in which the trial system works and the reasoning behind the rules governing its operation, including rules of evidence: the mechanics of the adversary system, relevancy, reliability, and rules of exclusion based on policy considerations other than relevancy and reliability. Includes such learning tools as videotapes, mock trials, observation of actual court trials, lectures, take-home assignments, and exams. *Prereq. CJ 1251 and CJ 1252.*
- CJ 1502 Evidence 2** 4 QH
Continues with reliability and rules of exclusion, based on policy considerations other than relevancy and reliability, as set forth in CJ 1501. *Prereq. CJ 1501.*
- CJ 1512 Seminar in Law and Criminal Justice** 4 QH
Specific topic in the law and criminal justice to be announced. *Prereq. CJ 1251, CJ 1252, and junior or senior standing.*
- CJ 1513 Criminal Homicide** 4 QH
Surveys the topic of homicide. Explores general murder patterns and analyzes types of homicide emphasizing mass and serial killing. Discusses criminal justice issues in apprehension, prosecution, and punishment of murder.
- CJ 1601 Survey of Correctional Systems** 4 QH
Offers an introduction to penology and corrections. Explores the public reaction to convicted offenders historically, while concentrating on issues and programs of contemporary corrections. *Prereq. CJ 1201.*
- CJ 1612 Juvenile Justice** 4 QH
Gives an overview of the institutional response to the problems of juvenile delinquency, juvenile misconduct, and dependent/neglected and abused children. Emphasizes the police, court, and correctional agencies that process young people. In addition, devotes attention to an understanding of the history of the system, recent legal developments, and an assessment of current proposals for reform. *Prereq. SOC 1100 and CJ 1201.*
- CJ 1613 Probation and Parole** 4 QH
Examines the nature and problems of correctional field service, both adult and juvenile. *Prereq. CJ 1601.*
- CJ 1615 Crime and Criminal Justice: A Comparative View** 4 QH
Examines the problems of crime and its control from the vantage point of the comparative perspective. Analyzes countries such as Soviet Russia, China, France, East Germany, and West Germany. Also analyzes Great Britain, Holland, Finland, and Sweden in terms of their incidence and type of deviance and crime, as well as in terms of approach to social control and prevention of crime. Examines points of divergence between these countries and the United States in perceived causes of crime and differing approaches to rehabilitation and crime prevention. *Prereq. CJ 1101, SOC 1100, or equivalent.*
- CJ 1616 Women and the Criminal Justice System** 4 QH
Introduces students to issues relating to roles taken by women involved with the criminal justice system and to the system's various responses to women in these roles. Focuses on women as victims of crime, as offenders, and as practitioners. *Prereq. Middler standing or above.*

CJ 1618 Victims of Crime 4 QH

Examines current theory and research regarding victims of crime. Devotes attention to concepts such as victim vulnerability and victim culpability. In addition, discusses the implications of a victim-oriented perspective for the administration of justice. Assesses current victim programs, including restitution, mediation, and compensation.

CJ 1621 Incarceration 4 QH

Offers in-depth familiarity with key reading in the history and sociology of incarceration. Topics include theories of incarceration; sentence determination; history of our incarceration systems; inmate and staff perspectives on incarceration; and special category inmates (mentally ill, rape victims, death row prisoners). Includes extensive discussion. *Prereq.* CJ 1301, middler standing or above, and QPA over B-; or permission of instructor.

CJ 1801, CJ 1802, CJ 1803, CJ 1804 Directed Study 4 QH each

Engineering

Chemical Engineering

The course descriptions listed under chemical engineering are intended to show the general scope of the subject that will be covered. Since courses are continually updated, specific topics or methods of approach may vary from term to term. In addition to meeting course prerequisites, students are expected to take each chemical engineering course in the sequence shown on the specimen program sheet.

CHE 1201 Chemical Engineering Calculations 1 4 QH
Examines the application of fundamental laws of mass and energy conservation to chemical and physical processes. Emphasizes material balances. A corequisite computational lab aids students in improving facility in handling problems typical of the course. Lab fee. *Prereq.* CHM 1132 and CHM 113S; CHE 1205 taken concurrently.

CHE 1202 Chemical Engineering Calculations 2 4 QH
Continues CHE 1201. Emphasizes energy balances and the simultaneous application of mass and energy conservation laws. Considers typical chemical processing industry problems. *Prereq.* CHE 1201.

CHE 1205 Computation Laboratory 2 QH
Offers lab sessions to aid students in problem formulation and solution. The assignments are based on material presented in CHE 1201. Emphasis is placed on computer software applications. Lab fee. *Prereq.* CHE 1201 taken concurrently.

CHE 1211 Chemical Engineering Thermodynamics 1 4 QH
Covers the first law and its application to batch and flow systems, heat effects in chemicals, and physical properties of real fluids. Applies basic principles and mathematical relations to the analysis and solution of engineering problems. *Prereq.* CHE 1201 and CHE 1205.

CHE 1310 Chemical Engineering Thermodynamics 2 4 QH
Covers thermodynamic properties of mixtures; fugacity and the fugacity coefficients from equations of state for gaseous mixtures; liquid phase fugacities and activity coefficients for liquid mixtures; phase equilibria; the equilibrium constant for homogeneous gas-phase reactions; and extension of theory to handle simultaneous, heterogeneous, and solution reactions. *Prereq.* CHE 1211.

CHE 1321 Momentum Transport 5 QH
Covers topics such as physical properties of fluids, pipe flow for process application, fluid metering, macroscopic balances and their application, microscopic balances, and boundary layer and turbulent flow theory. *Prereq.* CHE 1211 and CHE 1202.

CHE 1415 Experimental Methods 1 5 QH
Presents a comprehensive approach to solving experimental chemical engineering problems. Requires students to design, conduct, and report on experimental work orally and in writing. Involves experiments in unit operations in process measurements, fluid metering, and heat exchangers. Includes lectures on the principles of laboratory safety and data handling techniques. Lab fee. *Prereq.* CHE 1321.

CHE 1416 Experimental Methods 2 5 QH
Continues CHE 1415, requiring more advanced experimentation and more extensive reports. Involves experiments in unit operations in distillation, evaporation, extraction, filtration, or separations. Requires oral and written communications. Lab fee. *Prereq.* CHE 1415.

CHE 1421 Chemical Engineering Kinetics 4 QH
Covers fundamental theories of the rate of chemical change in homogeneous reacting systems; integral and differential analysis of kinetic data; design of batch and continuous-flow chemical reactors; and an introduction to heterogeneous reactions and reactor design. *Prereq.* CHE 1310.

CHE 1431 Heat Transport 5 QH
Presents the fundamentals of heat transport. Covers the design of heat transfer equipment and estimation of heat transfer rates. Includes conduction, convection, condensation, and boiling, and covers heat exchangers, evaporators, and driers. *Prereq.* CHE 1321.

CHE 1441 Separation Processes 5 QH
Describes the principles utilized in the physical separation of chemical mixtures. Covers filtration, evaporation, extraction, and distillation. Introduces equilibrium stages as applied to the separation of binary mixtures by liquid-liquid extraction and by continuous distillation. *Prereq.* CHE 1431.

CHE 1450 Chemical Engineering Economics 4 QH
Introduces financial decision-making techniques as applied to problems of production, storage, transportation, and utilization of chemical resources to meet societal needs. *Prereq.* ECN 1115.

CHE 1501 Chemical Process Design 1 6 QH
Focuses on the design of a chemical process. Topics include computer simulation of steady-state processing conditions, selecting process operations, preparing flowsheets and stream tables, and evaluating the economics of a chemical process design. Explores a comprehensive chemical process design problem with a team approach. *Prereq.* CHE 1421 and CHE 1441.

CHE 1502 Chemical Process Design 2 6 QH
Continues CHE 1501. Requires each student to solve a comprehensive chemical process design problem. Includes topics such as heat and power integration in chemical processing, design and scheduling of batch processes, sequencing separation operations, and safety considerations in process design. *Prereq.* CHE 1501.

CHE 1503 Projects 1 6 QH
Offers individual research related to some phase of chemical engineering. Open only to students selected by the department head on the basis of scholarship and proven ability. Lab fee. *Prereq.* Senior standing and permission of department.

CHE 1504 Projects 2 6 QH
Continues the research work begun in CHE 1503. Lab fee. *Prereq.* CHE 1503.

CHE 1511 Mathematical Methods in Chemical Engineering 4 QH
Examines the formulation and solution of problems taken from chemical and engineering studies that require advanced

mathematical methods. Emphasizes the formulation step, and discusses numeric and analytic solution techniques for solving sets of algebraic equations and for solving ordinary and partial differential equations. *Prereq.* Senior standing; *Chemical Engineering elective.*

CHE 1512 Chemical Process Control 4 QH

Covers the Laplace transform and its use in solving ordinary differential equations; modeling and computer simulation of basic heat, mass, and fluid-flow dynamics; linearization of nonlinear systems; the transfer function; sensors, transmitters, valves, and controllers; block-diagram algebra; dynamics of higher-order systems; modeling and simulation of control-loop dynamics; frequency response; and Laplace and frequency domain stability analysis. *Prereq.* Senior standing.

CHE 1514 Special Topics 4 QH

Presents chemical engineering topics of interest to the staff member conducting the class. *Prereq.* Senior standing.

CHE 1516 Mass Transfer Operations 4 QH

Focuses on the mass transfer operations of crystallization, adsorption, chromatography, ion exchange, and membrane separations. *Prereq.* Senior standing; *Chemical Engineering elective.*

CHE 1519 Polymer Science 4 QH

Introduces polymers and polymer chemistry, synthesis and reactions of polymers, and thermodynamics and kinetics of polymerization. Includes topics such as physical characterization of polymers; molecular structure, properties, and applications of polymers; and polymer processing and testing of polymers. *Prereq.* CHE 1421 and CHM 1272; *Advanced Chemistry elective.*

CHE 1520 Pollution Control in Chemical Industries 4 QH

Studies fundamental operations for handling environmental problems in the chemical process industries. Discusses water quality requirements and industrial waste characteristics. *Prereq.* Senior standing; *Chemical Engineering elective.*

CHE 1524 Chemical Process Safety 4 QH

Introduces students to important technical fundamentals as applied to chemical process safety. Demonstrates good chemical process safety practice through chemical plant trips, visiting experts, and video presentations. *Prereq.* Senior standing; *Chemical Engineering elective.*

CHE 1530 Biochemical Engineering Fundamentals 4 QH

Presents key concepts in biochemistry, cell biology, enzyme kinetics, and metabolic pathways, offered as an introductory exposure to these topics and not as complete coverage of life science fundamentals. Topics include biological reactor kinetics and design, transport phenomena in bioprocess systems, and process instrumentation/control. *Prereq.* Senior standing; *Chemical Engineering elective.*

CHE 1777 Honors Adjunct 1 QH

To be added to any 4 QH course in the department when approved by the Honors Committee of The College of Engineering. Once approved, the adjunct information is forwarded to the Honors Office for dissemination to the honors membership. Students may enroll in CHE 1777 an unlimited number of times as it can be adjunct to any chemical engineering course. *Prereq.* Permission of department.

CHE 1796 Honors Project 1 4 QH

Provides an opportunity for students to formulate and execute an analytical or experimental project under the guidance of a faculty member. Open only to students in the honors program. *Prereq.* Permission of department.

CHE 1797 Honors Project 2 4 QH

Continues CHE 1796. *Prereq.* CHE 1796.

Civil and Environmental Engineering

CIV 1210 Structural Mechanics 1 4 QH

Covers statics of particles and rigid bodies in two and three dimensions; analysis of internal forces in trusses and beams; centroids and centers of gravity of lines, area, and volumes; and moments of inertia of areas and masses. *Prereq.* MTH 1223 taken concurrently and PHY 1222.

CIV 1211 Structural Mechanics 2 4 QH

Surveys analysis of stress and strain; mechanical properties of materials; elastic analysis of stresses and deformations of members subject to axial load, torsion, shear, and moment. Introduces column behavior. *Prereq.* CIV 1210.

CIV 1220 Structural Analysis 1 4 QH

Reviews reactions, shear and bending moment diagrams, bar forces in trusses, deflections by virtual work, and moment area methods. Analyzes indeterminate structures by consistent deformations, slope deflection, and moment distribution. *Prereq.* CIV 1211.

CIV 1222 Structural Analysis 2 4 QH

Focuses on matrix analysis of indeterminate structures using both flexibility and stiffness approaches. Examines computer applications to analysis of framed structures. *Prereq.* CIV 1220, CIV 1226, and MTH 1230.

CIV 1226 Structural Analysis and Design Laboratory 2 QH

Uses lectures, experimental studies, computation labs, and computer projects to develop students' knowledge of structural behavior and understanding of the design and analysis of structures. *Prereq.* CIV 1220 taken concurrently.

CIV 1240 Concrete Design 1 4 QH

Reviews mechanical properties of steel and concrete. Studies behavior and design of reinforced concrete beams for shear, moment, and bond; and design of stocky columns for axial load and moment. Emphasizes strength design. *Prereq.* CIV 1220.

CIV 1241 Concrete Design 2 4 QH

Covers various topics including design of slender columns, foundations, and multistory buildings with one-way and two-way floor systems. *Prereq.* CIV 1240.

CIV 1245 Advanced Structural Design 4 QH

Continues concrete and steel design. Topics in concrete design include columns with axial loads and bending moments, biaxial bending, and slenderness effects; footings to support walls and columns; prestressed concrete fundamentals. Topics in steel design include bolted and welded connections with tension, shear, combined tension and shear, and eccentric shear; framed beam connections; beam-to-column moment connections; composite columns with combined bending and axial load; composite beams with full and partial composite action. *Prereq.* CIV 1240 and CIV 1250.

CIV 1250 Steel Design 1**4 QH**

Focuses on design of steel members subject to tension, compression, bending, and combinations of loading; and design of connections, braced frames, and rigid frames. *Prereq. CIV 1220 taken concurrently.*

CIV 1251 Steel Design 2**4 QH**

Discusses topics including design of steel plate girders, composite construction in bridges and buildings, plastic analysis and design, and the design of high-rise buildings subject to lateral loads. *Prereq. CIV 1250.*

CIV 1295 Structural Design Projects**4 QH**

Capstone structural design course. Consists of a minimum of two projects that consider environmental, social, and economic impact. Discusses the safety requirements of various government agencies. Projects require identification of design loading, assessment of structural stability, material usage, and the reliability of the proposed design. Employs computer-aided designs and verifies the results by approximate methods. Considers and analyzes economics of alternative designs. *Prereq. CIV 1240 and CIV 1250; CIV 1241 or CIV 1251 or CIV 1245; and senior standing. CIV 1222 taken concurrently.*

CIV 1310 Fluid Mechanics**4 QH**

Introduces both the statics and dynamics of fluid mechanics. Topics include properties of fluids; pressure variation in water and air; pressure force on surfaces and submerged bodies, continuity, momentum, and energy principles; dimensional analysis and hydraulic similitude; flow in closed conduits, frictional and local losses in pipes and systems; and problems in steady flow. *Prereq. CIV 1210.*

CIV 1320 Hydraulic Engineering**4 QH**

Covers a variety of topics including pipe networks; water hammer; pumps and pump selection; pipe-pump combinations; flow in open channels, uniform flow, gradually varied flow, and hydraulic jump; drag forces on bodies; principles of hydrology, unit hydrograph, and rainfall-runoff relationships; and some aspects of ground water and well hydraulics. *Prereq. CIV 1310.*

CIV 1340 Environmental Engineering 1**4 QH**

Focuses on protection and management of the environment. Topics include assessment of environmental quality; introduction to water and wastewater technology; air pollution control; and solid waste management. *Prereq. CHM 1132.*

CIV 1341 Environmental Engineering 2**4 QH**

Concentrates on unit operations, unit processes, and related fundamental design of physical, chemical, and biological water and wastewater treatment systems. Typical topics include aeration systems, activated sludge, fixed film biological treatment, gas transfer, reaction kinetics, reactor modeling, sedimentation, filtration, and subsurface disposal system design. *Prereq. CIV 1310 and CIV 1340.*

CIV 1350 Environmental and Hydraulics Design Laboratory**4 QH**

Presents lectures and laboratory experiments in the areas of hydraulic and environmental engineering. Laboratory experiments have related design projects which will allow the student to investigate a unit operation or process in some depth. Topic areas covered include several of the following: wastewater neutralization, biological treatment, coagulation, oxygen demand, oxygen transfer, sedimentation, weirs, pumps, ion exchange, carbon absorption, and disinfection. *Prereq. CIV 1320 taken concurrently and CIV 1340.*

CIV 1370 Air Pollution**4 QH**

Focuses on theory and practice related to engineering management of air resources. Surveys microclimate and dispersion of pollutants; atmospheric chemistry; air pollution instrumentation; control of gaseous and particulate emissions; design of air pollution control systems; and biological and chemical aspects of air pollution with emphasis on the toxicological aspects of the environment. Other topics include the physiological effects of aerosols; analysis of organic and inorganic constituents of the atmosphere; and rationale for establishment of air quality criteria and standards. *Prereq. Junior standing.*

CIV 1395 Environmental Design Projects**4 QH**

Capstone design course in the field of environmental engineering. Up to six individual design projects are assigned, typically involving water and/or waste treatment, site development, industrial waste handling, chemical treatment, and the modification of existing facilities. Each is given a careful critique. Designs require input relating to environmental protection and impact, economic factors, engineering feasibility, selection from alternatives, and safety consideration. One project requires an oral presentation. *Prereq. CIV 1320, CIV 1341, CIV 1350, and senior standing.*

CIV 1410 Soil Mechanics**4 QH**

Studies soil classification, soil-water phase relations, ground water seepage, consolidation theory, strength properties of soils, stress distributions in soils due to surface loads, and slope stability. *Prereq. CIV 1211. CIV 1310 taken concurrently.*

CIV 1411 Soil Mechanics Laboratory**2 QH**

Focuses on lab exercises, including soil classification, seepage, shear strength, consolidation, and triaxial testing. *Prereq. CIV 1410 taken concurrently.*

CIV 1420 Foundation Engineering**4 QH**

Topics include subsurface explorations, determination of soil-bearing capacity, design of shallow foundations, pile and caisson foundations, design of retaining walls, anchored bulkheads and braced sheeting, and other selected topics on foundation design and construction. *Prereq. CIV 1410.*

CIV 1430 Geotechnology**4 QH**

Introduces the geological sciences as they apply to civil engineering practice. Focuses on the effects of significant geological features on location, design, construction, operation, and maintenance of engineering projects. *Prereq. CIV 1410 taken concurrently.*

CIV 1495 Geotechnical Design Projects**4 QH**

Capstone design course for those interested in the geotechnical area. Two or more projects involving the various aspects of analysis and design used in geotechnical practice. Requires evaluation of subsurface conditions, identification of critical issues, assessment of environmental impacts, economics, safety, construction sequencing, and construction feasibility. They may also include structural design. Examples include design of foundations for super-structures, temporary earth retaining systems for deep excavations, and permanent earth support walls for deep earthen cuts. *Prereq. CIV 1420 and senior standing. CIV 1430 taken concurrently.*

CIV 1510 Materials**4 QH**

Focuses on the structural, chemical, and mechanical properties of materials of importance to civil engineers. Topics include fundamental nature of matter; significance of phase transformations; control of microstructure; and the mechanisms of failure of materials. *Prereq. CHM 1131.*

CIV 1511 Materials Laboratory**2 QH**

Uses standard tests and equipment in the lab to determine structural and mechanical properties of materials common to civil engineering practice: concrete, aggregates, steel, wood, asphalt, and others. *Prereq. CIV 1510 taken concurrently.*

CIV 1530 Transportation Analysis and Planning**4 QH**

Studies the analysis and demand prediction for urban passenger transportation and travel demand forecasting by the traditional four-step method and other methods. Discusses impact assessment, including traffic, environmental, and economic impacts. Topics also include the history of urban transportation and analysis of current policy issues. *Prereq. MTH 1123.*

CIV 1540 Highway Engineering**4 QH**

Presents an overview of highway engineering, including route selection, geometric design, pavement design, drainage, construction, and maintenance. Discusses highway administration, financing, costs, planning and the environmental impact process, and traffic engineering fundamentals for highways. *Prereq. CIV 1620.*

CIV 1550 Construction Management**4 QH**

Surveys the construction industry and tasks that must be addressed by construction management, including resource allocation, construction environment, organization, contracts, funding, cash flow, productivity, labor relations, network planning and scheduling, construction accounting, and project control. *Prereq. Junior standing.*

CIV 1595 Transportation Design Projects**4 QH**

Capstone design course in transportation. Involves planning/design of modified transportation facilities and services. Topics include demand estimation, highway design, traffic flow, safety, economic and social considerations, environmental impacts, and transit fleet size requirements. Examples of such projects are planning for a new highway, transportation systems management planning for an existing corridor, and design of an intermodal transfer facility. *Prereq. CIV 1530, CIV 1540, CIV 1630 taken concurrently, CIV 1640, and senior standing.*

CIV 1620 Engineering Measurements**4 QH**

Considers the mathematics and instrumentation used in land surveying for obtaining measurements of distance, elevation, and direction. Covers the methodology applied for traverses, areas, coordinate systems, horizontal and vertical curves, earthwork, and topographic mapping. *Prereq. MTH 1124 and PHY 1221.*

CIV 1621 Engineering Measurements Laboratory**2 QH**

Examines field problems illustrating and applying the lecture material in CIV 1620 with computer applications. *Prereq. CIV 1620 taken concurrently.*

CIV 1630 Civil Engineering Systems**4 QH**

Covers application of system synthesis and optimization techniques: calculus method, linear programming, network analysis, and dynamic programming. *Prereq. MTH 1223.*

CIV 1640 Applied Probability Theory for Civil Engineers**4 QH**

Covers applications of probability theory to civil engineering problems, probabilities of events, random variables and distributions, derived distributions, expectation, common probability models, and an introduction to statistics. *Prereq. MTH 1223.*

CIV 1650 Legal Aspects of Civil Engineering**4 QH**

Introduces business law for engineering organizations, including description and evaluation of various types of contracts for engineering services and construction, procedures for submitting bids, procedures for claims, and legal steps to minimize risk exposure, both in United States and international business. *Prereq. Junior standing.*

CIV 1665 Professional Issues for Civil Engineers**1 QH**

Focuses on concepts and theories of classical and contemporary ethics, moral development theories, and developing and applying professional ethics in engineering. Traces the development and philosophies of professional engineering societies. Covers the requirements and responsibilities of professional registration. *Prereq. Junior standing.*

CIV 1777 Honors Adjunct**1 QH**

To be added to any 4 QH course in the department when approved by the Honors Committee of the College of Engineering. Once approved, the adjunct information is forwarded to the honors office for dissemination to the honors membership. Students may enroll in CIV 1777 an unlimited number of times as it can be adjunct to any civil engineering course.

CIV 1796 Independent Study/Research 1 (Honors)**4 QH**

Involves an analytical or experimental project under the supervision of a department faculty member. Before the end of the first week of the quarter, each student must obtain written approval for a proposed project from the faculty supervisor and from the department. A formal report must be submitted to the faculty supervisor at the end of the quarter. *Prereq. Junior or senior standing in the honors program.*

CIV 1797 Independent Study/Research 2 (Honors)**4 QH**

Continues CIV 1796, or a new project following the guidelines of CIV 1796. *Prereq. CIV 1796.*

CIV 1810 Special Topic in Civil Engineering**4 QH**

This is a special course within the field of civil engineering initiated by the appropriate discipline committee and approved by the department. *Prereq. Permission of instructor.*

CIV 1820 Special Project in Civil Engineering**4 QH**

Offers individual study in an area within the field of civil engineering, selected by the student and his or her instructor with approval by the appropriate discipline committee, resulting in a definitive report and an oral presentation. *Prereq. Outstanding academic performance.*

CIV 1821 Special Project in Civil Engineering**2 QH**

For students wishing to spread an independent project over two quarters. Taking CIV 1821 twice is equivalent to taking CIV 1820. Can be taken over two quarters, with students registering for each quarter.

Electrical Engineering

ECE 1171 Electrical Engineering I**4 QH**

Introduces the basic concepts related to circuits and circuit elements; current, voltage, and power; models for resistors, capacitors, and inductors; and circuit analysis using Kirchhoff's laws.

Discusses selected topics that illustrate the variety of applications of electrical engineering, such as AC circuits and electric power, the basics of semiconductor devices with application to transistor amplifier models, transients in circuits with energy storage, digital signals, logic circuits, and some basic concepts of computer operation, specifically number coding, arithmetic operations, and memory circuits. *Prereq.* MTH 1125; *not open to electrical engineering majors.*

ECE 1178 Digital Electronics for Computer Science Majors 4 QH

Introduces electronic digital circuits preparing computer science majors for ECE 1382. Starts with the basics of electronic circuit analysis and continues with the principles of MOS and bipolar semiconductors and their applications to logic gate circuits. Discusses logic circuit design supplemented by hardware considerations: level tolerance, power dissipation, gate, and component count. Introduces circuits with RC time constants to explain delays and speed limitations of logic circuits. Describes basic logic array circuits with application to ROM and PROM. *Not open to electrical engineering majors.*

ECE 1215 Circuits I 4 QH

Introduces the basic laws and the basic signal and device models used in the study of linear circuits. Topics include a review of the basic quantities of charge, current, voltage, and power; the basic circuit elements; Kirchhoff's Laws; and Tellegen's Theorem. Covers the concepts of series and parallel connections and equivalent circuits, and the Thevenin and Norton theorems. Introduces three-terminal and dependent source models, with extensive coverage of the ideal operational amplifier model. Discusses various common signal models, including step functions, exponentials, sinusoids, first and second order circuits and the classical solution to the related differential equations. *Prereq.* ECE 1240, MTH 1125, MTH 1225 and PHY 1223. *ECE 1241 must be taken concurrently.*

ECE 1216 Circuits and Systems 2 4 QH

Presents the Laplace transform as a technique for solving the types of differential equations which model linear circuit behavior, followed by Laplace transform equivalent circuit models. Systematic methods for writing circuit equations, including node-voltage and mesh methods, are introduced simultaneously for real and Laplace transform circuit models. Studies the concepts of system function and frequency response, including some study of filter and transfer function design and Bode plots. *Prereq.* ECE 1215 and MTH 1225. *ECE 1222 must be taken concurrently.*

ECE 1217 Circuits and Systems 3 4 QH

Continues the study of basic filter design and Bode plots discussed in ECE 1216. Covers a number of topics related to the sinusoidal steady state at fixed frequency (AC circuits), including phasors, phasor circuits and phasor diagrams; transformers; AC power; and three-phase. Also discusses convolution, two-port networks and Fourier series and Fourier transforms. *Prereq.* ECE 1216. *ECE 1223 must be taken concurrently.*

ECE 1221 Measurements Laboratory 1 QH

Covers fundamentals of electrical measurements and instrumentation. Topics include electrical characteristics of meter movement and its use in designing ammeters and voltmeters; sources of DC current and voltage and their characteristics; the oscilloscope and its application to the display of waveforms and I-V curves of two-terminal devices; and the measurement of amplitude, phase, and time interval. *Prereq.* PHY 1223. *ECE 1215 must be taken concurrently.*

ECE 1222 Circuits Laboratory 1 1 QH

Offers experiments in basic circuits and measurements. Topics include AC waveforms and circuits for the measurement of peak, average, and RMS values; network theorems, their experimental verification; null circuits such as the Wheatstone bridge and the potentiometer; and characterization of simple LTI circuits including RL, RC, and RLC circuits, by investigation of their step response and impulse response. *Prereq.* ECE 1221. *ECE 1216 must be taken concurrently.*

ECE 1223 Circuits Laboratory 2 1 QH

Offers laboratory experiments including operational amplifier realizations of controlled sources, resonance in second-order linear circuits, active RC and RLC circuits, and frequency responses of RC circuits. *Prereq.* ECE 1222. *ECE 1217 must be taken concurrently.*

ECE 1224 Electronics Laboratory 1 1 QH

Follows from ECE 1346. Experiments include characteristics and applications of diodes, MOSFET characteristics and CMOS logic applications, design and evaluation of a regulated power supply, and transistor biasing stability. *Prereq.* ECE 1346. *ECE 1347 must be taken concurrently.*

ECE 1225 Electronics Laboratory 2 1 QH

Follows from ECE 1347. Experiments with designing and verifying basic analog circuit functions utilized in integrated circuits. Advantages inherent to ICs, such as component matching and tracking, are exploited in the circuit building blocks investigated. Studies output power stages, current sources, amplifying stages, and differential amplifiers. Topics include applications to signal amplification, D-to-A conversion, and the extraction of weak signals buried in interference. *Prereq.* ECE 1347. *ECE 1349 must be taken concurrently.*

ECE 1226 Discrete Systems Laboratory 1 QH

Utilizes a personal computer to study aspects of A/D and D/A conversion, some aspects of discrete-time Fourier transforms and digital filters. *ECE 1333 must be taken concurrently.*

ECE 1227 Electromagnetic Fields Laboratory 1 QH

Supports class material related to microwave transmission and radiation. Experiments include microwave transmission line measurements and the determination of the properties of dielectric materials; transmission line length measurement; reflection and impedance measurement of dipole antenna; frequency characteristics of antennas and waveguides; and antenna mutual coupling and radiation pattern determination. *ECE 1364 must be taken concurrently.*

ECE 1228 Energy Devices Laboratory 1 QH

Investigates transformers and DC machines; conducts tests to model the energy device and evaluate its load characteristics, thereby supporting the theory learned in ECE 1370. *ECE 1365 or ECE 1370 must be taken concurrently.*

ECE 1229 Digital Systems Laboratory 1 QH

Introduces some aspects of computer hardware design encountered at the digital logic level. Discusses both combinational logic and sequential logic units. Focuses on MSI devices including multiplexers, decoders, counters, shift registers, PROM, RAM, and ALU. Demonstrates the design of Mealy and Moore sequence detectors and other digital subsystems such as parallel binary divider. Covers the use of a field programmable gate array for implementing the design. *ECE 1382 must be taken concurrently.*

ECE 1230 VLSI System Design Laboratory**2 QH**

Examines the design, layout, and simulation of digital VLSI circuits using a comprehensive set of CAD tools. Studies layouts of CMOS combinational and sequential circuits using either a layout editor or automatic layout generators. Studies functional structures including registers, adders, decoders, ROM, PLAs, counters, RAM, and ALU. Utilizes logic and circuit simulators for the logic verification and timing simulation of designed circuits. Designs can be sent to MOSIS for fabrication. *ECE 1351 must be taken concurrently.*

ECE 1231 Power Systems Laboratory**1 QH**

Applies techniques covered in ECE 1472, addressing topics such as transmission line constants, load flow and short-circuit studies, and transient stability. Includes upgrading the design of a small power system. *ECE 1472 must be taken concurrently.*

ECE 1232 Electric Machines Laboratory**2 QH**

Investigates topics in electromechanical energy conversion employing Faraday's Law Machine Bench. Studies steady-state and transient-state behavior of induction, synchronous, and DC machines. *ECE 1371 must be taken concurrently.*

ECE 1233 Semiconductor Processing Laboratory**2 QH**

Covers fabrication and testing of MOS integrated circuits. Students compare process and device models introduced in ECE 1406 with experimental results during weekly lab sessions. Lab work includes oxidation, diffusion, lithography, etching, metallization, and characterization. Fabricated integrated circuits will be electrically characterized. *ECE 1406 must be taken concurrently.*

ECE 1234 Digital Signal Processing Laboratory**2 QH**

Focuses on practical aspects of DSP by programming a digital signal processing chip in its native assembly language. Topics include, but are not limited to, input/output operations via A/D and D/A converters, digital frequency synthesis, computation of discrete time convolution, and design and implementation of both FIR and IIR digital filters. *ECE 1456 must be taken concurrently.*

ECE 1235 Control Systems Laboratory**1 QH**

Familiarizes the student with the practical aspects of control systems design through lab experiments. Topics include analog computer simulation, digital computer control, and use of CAD packages such as MATLAB for analysis and design of control systems. Experiments with PID control emphasize classical methods of feedback compensation, and an experiment with modern techniques of state variable feedback considers digital speed control of a DC motor. *ECE 1420 or ECE 1421 must be taken concurrently.*

ECE 1240 Introduction to Electrical Engineering Laboratory**1 QH**

Provides a hands-on introduction to electronic circuits, devices, and measurement techniques. Students will design, assemble, and test a working electronic system. *Prereq. PHY 1223.*

ECE 1241 Circuits Laboratory**1 QH**

Covers experiments reinforcing basic circuit theory topics such as equivalent circuits, voltage/current divider applications, potentiometers or the Wheatstone bridge, experimental verification of network theorems, operational amplifier behavior, and/or response of RL, RC, and RLC circuits. *Prereq. ECE 1240, MTH 1125, MTH 1225. ECE 1215 must be taken concurrently.*

ECE 1242 Electronics Laboratory 1**1 QH**

Includes experiments such as characterization of semiconductor devices, CMOS logic gates, and amplifiers. *ECE 1341 must be taken concurrently.*

ECE 1243 Electronics Laboratory 2**1 QH**

Includes experiments using multistage amplifiers, differential amplifiers, frequency response, and feedback. *ECE 1342 must be taken concurrently.*

ECE 1246 Circuits 2**4 QH**

Presents the unilateral Laplace transform as a technique for solving differential equations with initial conditions which model linear circuit behavior, followed by the introduction of Laplace transform equivalent circuit models. Simultaneously introduces systematic methods for writing circuit equations, including node-voltage and mesh methods, for real and Laplace transform circuit models. Covers several topics connected to the use of network functions including pole/zero plots, frequency response, and a brief treatment of the synthesis of circuits to match given transfer functions. Considers circuits in the sinusoidal steady-state, first introducing phasor representations, then applying phasors to analyze resonance, ideal and linear transformers, and complex power and three-phase systems. *Prereq. ECE 1215.*

ECE 1308 Physical Electronics**4 QH**

Develops elements of solid-state theory including semiconductor statistics and electron transport theory to provide the background for a thorough understanding of the p-n junction diode. Uses this knowledge to explore devices commonly used in modern electronic circuits, including ohmic contacts, Schottky barrier diodes, MOS transistors, and bipolar junction transistors. Designed to provide the device background needed for advanced study in the areas of integrated circuit fabrication, VLSI design, and electronic design. *Prereq. ECE 1342.*

ECE 1332 Linear Systems 1**4 QH**

Discusses continuous systems first from the time domain viewpoint and then from the frequency domain viewpoint. Begins the time domain presentation with a general discussion of systems as a mapping followed by a discussion of time-invariance. Presents linear time-invariant system theory in detail including topics such as convolution, causality, stability, system interconnections, and the system sinusoidal response. Begins the frequency domain presentation with a discussion of the Fourier transform as a basis for the development of the bilateral Laplace transform and the s-plane. Discusses the Fourier and Laplace transforms and their properties, and develops, in terms of these transforms, system aspects such as causality, stability, and the system analysis. Uses the s-plane viewpoint to study the stability of feedback systems and the system gain and phase-shift. *Prereq. ECE 1246 or ECE 1217.*

ECE 1333 Linear Systems 2**4 QH**

Develops the basic theory of linear discrete systems. Discusses the representation of discrete signals and analyzes continuous waveform sampling and quantization. Develops the theory of shift-invariant, linear systems. Discusses FIR and IIR systems, recursive analysis, convolution, causality, and stability in detail. Develops the discrete Fourier transform and the Z-transform and then analyzes discrete signals and systems in the frequency domain. *Prereq. ECE 1332. ECE 1226 must be taken concurrently.*

- ECE 1334 Linear Systems 3** **4 QH**
Reviews signals and systems in the frequency domain, applying these concepts to the analysis of various filter types and their applications. Discusses feedback and development of various techniques for the study of stability. Introduces the state variable technique, and uses circuit examples to illustrate and interpret the state equations in the time and frequency domains. *Prereq.* ECE 1333.
- ECE 1341 Electronics 1** **4 QH**
Introduces the analysis and design of modern electronic circuits, as well as the operation of the principal semiconductor devices: diodes, field-effect transistors, and bipolar junction transistors. Focuses on using large- and small-signal semiconductor device models to understand the operation of logic gates and single stage amplifiers. *Prereq.* ECE 1215. ECE 1242 must be taken concurrently.
- ECE 1342 Electronics 2** **4 QH**
Develops the analysis techniques required to design amplifiers. Discusses feedback, frequency response, stability, and compensation. Addresses topics such as biasing, single and compound amplifier stages, feedback amplifiers including impedance, Nyquist's stability criterion, and compensation of feedback amplifiers. *Prereq.* ECE 1341. ECE 1243 must be taken concurrently.
- ECE 1343 Electronic Design 1** **4 QH**
Develops analysis and design techniques for digital and mixed analog/digital circuits. Recommended for students interested in working in the integrated circuit industry, or with electronic hardware. Examines CMOS and ECL logic families, multivibrators, Schmitt triggers and comparators, pulse generators, and D/A and A/D converters. *Prereq.* ECE 1342.
- ECE 1344 Electronic Design 2** **4 QH**
Extends the concepts of Electronics 2 and Electronic Design 1 to a variety of signal processing circuits. Requires students to do at least three major circuit designs, which may include the following: active filters, analog multipliers, saw-tooth generators, sinusoidal oscillators, switching power supplies, and electronic sensors. *Prereq.* ECE 1343.
- ECE 1346 Electronics 1** **4 QH**
Emphasizes the use of solid-state devices in digital circuits. Introduces semiconductor concepts leading to the p-n diode equation and Ebers-Moll equations. Develops large-signal linear diode models allowing the application of linear circuit theory to diode circuits. Studies FET and BJT devices and develops models of their characteristics. Shows applications of transistors to inverters and logic gates and introduces concepts of transfer characteristics, voltage thresholds, and noise margins. Studies binary values, logic operations, Boolean algebra, and symbolic logic gates with application to semiconductor circuits. Also studies fundamental circuits in the NMOS, CMOS, ECL, and TTL logic families. Considers transient capacitive effects in digital circuits and uses circuit simulation software to model diode and transistor circuits. *Prereq.* ECE 1216.
- ECE 1347 Electronics 2** **4 QH**
Covers the use of transistors for analog applications. Develops small signal models for diodes, field-effect transistors, and bipolar transistors. Studies discrete component and integrated circuit biasing techniques. Linearized incremental model characteristics are calculated for basic amplifier stages and for compound and cascaded amplifiers. Introduces the differential amplifier stage and applied with other stages creates a model operational amplifier design. Introduces device capacitive effects and the frequency responses for single and compound stages are calculated. Develops dominant-pole and time-constant techniques for estimating the frequency response and gain-bandwidth product of amplifiers and idealized op-amps. Emphasizes the design of multi-stage amplifiers to gain, impedance, and frequency specifications. *Prereq.* ECE 1346. ECE 1224 must be taken concurrently.
- ECE 1349 Electronic Design 1** **4 QH**
Introduces electronic circuit design concepts through operational amplifier architecture and applications. Studies the effect of feedback on sensitivity, impedance levels, gain and frequency response. Treats the stability criteria and the design of compensation networks. Extends feedback concepts to the design of bistable, monostable, and astable circuits and analog-to-digital and digital-to-analog converters. *Prereq.* ECE 1347. ECE 1225 must be taken concurrently.
- ECE 1351 Special Topics in IC Design** **4 QH**
Offers a structured digital MOS design course in designing, verifying, and fabricating CMOS VLSI integrated circuits. Introduces required design rules and relates them to the fabrication process. Begins design exercises and tutorials with basic inverters and proceeds to the design, verification, and performance of large complex digital logic networks. Develops a simple RC delay model in conjunction with the theory of delays in VLSI systems. Other topics include program logic arrays and automatic design tools, shift registers, arithmetic logic units, and memory systems. *Prereq.* ECE 1382. ECE 1230 must be taken concurrently.
- ECE 1355 Communication Systems 1** **4 QH**
Introduces basic concepts of analog and digital communication in additive white Gaussian noise (AWGN) channels. Reviews Fourier transform and Fourier series signal representation and introduces random processes. Examines power spectrum density, analog modulation and demodulation techniques, concepts of information sources and source coding algorithms, principles of optimum receiver design for AWGN channels, correlation and matched filter receivers, and probability of error analysis for binary and M-ary signals. *Prereq.* MTH 1384 and ECE 1333.
- ECE 1363 Electromagnetic Fields 1** **4 QH**
Develops the fundamental equations of electromagnetics and presents applications. Introduces the mathematics necessary for electromagnetics: complex vector phasors and vector calculus. Defines the electromagnetic field with the Lorentz force equation. Presents and applies Coulomb's and Biot-Savart's laws. Explains the macroscopic constitutive relations. Formulates Maxwell's equations in both integral and differential form. Develops Poynting's theorem. Presents the principles for the operation of generators and motors. Derives the wave equation and studies the uniform plane wave solution in both time and frequency domain. Concludes with the reflection and transmission of plane waves. *Prereq.* MTH 1223, MTH 1225, and PHY 1224.
- ECE 1364 Electromagnetic Fields 2** **4 QH**
Studies electrodynamic applications of electromagnetic field theory: lossless transmission lines, waveguides, optical fibers, and antennas. Develops transmission line theory by use of distributed circuit elements and introduces the TEM waves. Obtains solu-

tions analytically and also graphically using the Smith Chart. Seeks TM and TE solutions for parallel-plate waveguides and general rectangular metal waveguides. Examines optical fibers after a study of uniform plane wave refraction. Investigates the radiation properties of electric dipoles and studies the enhancement of directivity using phased arrays. *Prereq.* ECE 1363. *ECE 1227 must be taken concurrently.*

ECE 1365 Electromagnetic Fields and Energy Conversion 4 QH

Focuses on the static and quasi-static solution of the electromagnetic field equations and emphasizes energy conversion and transducers. Topics include magnetostatics; magnetic materials and transducers; and magnetic circuits, transformers, and energy conversion concepts applied to DC, synchronous, and induction machines. *Prereq.* ECE 1364. *ECE 1228 must be taken concurrently.*

ECE 1366 Computational Electromagnetics 4 QH

Presents numerical and computational approaches to electromagnetic field problems, as well as design problems. Gives students the opportunity to use software environments such as Matlab to implement the various algorithms for solution and to present graphical results. Begins with the finite difference approach for solving the major partial differential equations of electromagnetics: Laplace's equation, the diffusion equation, and the wave equation. Introduces integral equations as foundation for solving problems with the method of moments. Makes applications to the linear antenna and to antenna arrays. Presents computational models for solving design problems so that students may carry out individual design studies. *Prereq.* ECE 1364.

ECE 1370 Electric Energy Devices 4 QH

Reviews phasor diagrams and three-phase circuits, and presents magnetic aspects including magnetic circuits, energy storage, and permanent magnets. Includes other topics such as elements of transformers, principles of electromechanical energy conversion, and steady-state theory of induction, synchronous, and DC machines. *Prereq.* 1246, ECE 1364. *ECE 1228 must be taken concurrently.*

ECE 1371 Electric Drives and Motion Systems 4 QH

Continues ECE 1370. Presents steady-state theory and performance of induction, synchronous, and DC machines. Investigates transients and dynamics of AC and DC machines. Introduces power semiconductor controlled drives. *Prereq.* ECE 1370. *ECE 1232 must be taken concurrently.*

ECE 1379 Analysis of Electrical Transients 4 QH

Focuses on transient behavior, where tools of linear, time-invariant analysis are operative. Draws examples from the power system and from computer interconnections. Studies topics and methods of broad interest in all of electrical engineering, exploring events such as communication over long and short transmission lines, circuit breaker action, transient recovery voltage, restriking, transient inrush current, geomagnetically induced currents, ferroresonance and capacitor flashover using piecewise-linear analysis techniques. Uses Matlab and Excel to attack real problems. Examines the real-world non-LTI behavior of transformers, transmission lines, circuit breakers, surge arresters, and lightning. Gives students the opportunity to do an analysis project, in which they model mathematically some transient event which they create in the lab or extract from the literature and then evaluate how well their mathematical model describes reality. *Prereq.* ECE 1333 and ECE 1342.

ECE 1381 Computer Engineering 1: Introduction to Computer Architecture 4 QH

Presents a view of the architecture of a modern computer; the visible architecture provides the starting point. Uses assembly language programming to develop a foundation on the hardware which executes a program and shows what a compiler, assembler, and linker do and how they interact with the architecture. Explores data structures from a programmatic perspective (static storage, stack, and heap) and from a high-level language perspective (simple data types, and structured data types). Covers several types of computer number systems and arithmetic (2s-complement, IEEE floating point, and logical operations). Includes numerous programming exercises and a software design project to develop working facility with the tools and concepts that underlie the next three computer engineering courses. *Prereq.* GE 1101 or equivalent.

ECE 1382 Computer Engineering 2: Design of Digital Logic Machines and Circuits 4 QH

Continues ECE 1381 with a bottom-up view of the design of logic machines, leading to the design of a simple digital computer by the end of the quarter. Covers Boolean switching algebra and gate-count minimization; combinational design; sequential circuits; state machines; PLA, PAL, and ROM realizations; CPU design, design of the ALU, and control unit design. Introduces CAD logic design tools. Requires a design project using SSI and MSI chips to develop facility in the design and testing of functional digital circuits. Proof of the circuit will be done using the CAD tools. *Prereq.* ECE 1381. *ECE 1229 must be taken concurrently.*

ECE 1383 Computer Engineering 3: Microprocessor-Based Design 4 QH

Provides an introduction to both hardware and software issues in interfacing microprocessors to their local and outside worlds. Includes lab and lecture components to develop both analytical understanding and design skills. Examines the following hardware items: bus characteristics, timing and protocols; memory organization; memory-mapped I/O; and interrupts. Studies complementary software topics including polling versus interrupt driven I/O and exception processing. *Prereq.* ECE 1382.

ECE 1384 Computer Engineering 4: Computer Organization and Design 4 QH

Provides a coherent, structured overview of the current state of Computer Organization and Design. Studies the strategies for attaining high performance using the instruction set of a real architecture. Focuses on the forces that drive cost/performance decisions to achieve successful designs. Highlights design principles based on the interactions of hardware and software. Topics include performance metrics, machine language, processor data path and control path designs, pipelining, memory hierarchies, I/O devices and interfacing techniques, and parallel processing. Provides a deeper understanding of design and performance issues in laboratory exercises using software simulators. *Prereq.* ECE 1383.

ECE 1385 Computer Engineering 5: Introduction to Robotics 4 QH

Teams two students together to design and implement a small mobile robot system to complete a specific task. Students compete their robots against robots built by other teams in the class at the end of the course. Develops students' design capabilities of microprocessor controlled systems with input from sensory devices and output actuators. Topics include actuators, sensors, and system modeling. *Prereq.* ECE 1333 and ECE 1383.

ECE 1386 Computer Engineering 6:**Structure of Large-Scale Computer Systems**

Studies the C++ programming language with an overview of object-oriented design in the first part of the course. A C++ tutorial will be provided. Focuses on high-performance computer architecture in the second part of the course. Includes micro-processor design, multiprocessors, memory coherency and consistency, and the hardware-software interaction. *Prereq.* ECE 1384.

ECE 1390 Senior Project Laboratory 1

Allows students to work with a faculty adviser on a term project, either experimental or theoretical. *Prereq.* *Permission of department.*

ECE 1391 Senior Project Laboratory 2

Continues the project started in ECE 1390 or it may be a new project. *Prereq.* *Permission of department.*

ECE 1400 Special Topics

Covers various topics from term to term depending on the interests of the department and the students. *Prereq.* *Permission of department.*

ECE 1406 Integrated Circuit Fabrication

Provides an overview of integrated circuit fabrication from the viewpoint of the process engineer. Focuses on the physics, chemistry, and technology of integrated circuit fabrication. Uses the industry-standard process simulator SUPREM-IV to supplement analytical process models. Expands on the semiconductor device background learned in ECE 1308. Reviews MOS operation and device models in conjunction with testing of the integrated circuit fabricated in the lab (ECE 1233). Concentrates on silicon IC technology, but also discusses other material systems and microstructures including GaAs and microsenors. *Prereq.* ECE 1308. ECE 1233 must be taken concurrently.

ECE 1420 Control Systems

Comprises closely coupled lectures and laboratory experiments. Topics covered include control system concepts, basic components and goals, modeling and mathematical description, transfer function and state variable representations, feedback control system characteristics, system responses, stability of feedback systems, analysis of graphical tools such as root-locus and Nyquist diagram, compensator design based on root-locus and frequency response, and modern control system design. *Prereq.* ECE 1333 and ECE 1347. ECE 1235 must be taken concurrently.

ECE 1421 Control Systems

Introduces the analysis and design of classical control systems and comprises closely coupled lectures and laboratory experiments. Examines control system concepts, basic components and goals, modeling and mathematical description, transfer function and state variable representations, feedback control system characteristics, system responses, and stability of feedback systems. Also addresses analysis of graphical tools such as root-locus and Nyquist diagram compensator design based on root-locus and frequency response, and modern control system design using state variable feedback. *Prereq.* ECE 1334. ECE 1235 must be taken concurrently.

4 QH

ECE 1455 Communication Systems 2

Presents the fundamentals of state-of-the-art digital communication systems and coding techniques. Covers digital data transmission through bandlimited Gaussian channels, equalization, digital carrier modulation schemes, optimal receiver design and their error performance, capacity and coding for reliable communication, block and convolutional codes and their decoding, direct sequence and frequency hopped spread spectrum systems. *Prereq.* ECE 1355.

ECE 1456 Digital Signal Processing

Introduces concepts in modern signal processing. Topics include review of discrete time signals and systems, discrete Fourier transform, realizations structures for digital filters, FIR filter design, IIR filter design, fast Fourier transforms, and applications to fast convolution. *Prereq.* ECE 1333. ECE 1234 must be taken concurrently.

ECE 1458 Communication Networks

Provides students with a working knowledge of common, standardized network protocols. Employs the Open Systems Interconnection (OSI) model as a layered framework for discussing design principles, management of complexity, standardized connectivity, routing, switching and multiplexing techniques. Describes issues, protocols, and standards associated with the various layers: synchronization, framing, and error; stop-and-wait, ARQ, and Go-Back-N protocols for flow and error control; multiple access protocols, such as Aloha and CSMA, and Local and Metropolitan Area Networks (LANs/MANs), such as Ethernet, Token-Ring and FDDI, routing, congestion, and flow control with applications in X.25 and IP; TCP/IP and higher layer functions. Describes the current Integrated Services Digital Networks (ISDN) technology followed by an introduction to Broadband-ISDN and Asynchronous Transfer Mode (ATM) Networks. *Prereq.* MTH 1384 and ECE 1355.

ECE 1463 Antennas

Introduces the fundamental principles of antenna theory. Applies these principles to the design and analysis of practical antennas. Covers fundamental antenna parameters, radiation integrals and auxiliary potential functions, linear and loop antennas, antenna arrays, broadband dipoles and impedance matching techniques, traveling wave and broadband antennas, and frequency independent, aperture and reflector antennas. *Prereq.* ECE 1364.

ECE 1464 Microwave Networks

Focuses on advanced analytical, graphical, and matrix analyses of transmission lines and microwave networks. Covers analyses of lossy and lossless transmission lines, electrical scattering S-parameters, ferrite networks, microwave absorbers, and matrix representation of multiple connected networks. *Prereq.* ECE 1364.

ECE 1466 Modern Optics

Presents the basic optical concepts necessary for an understanding of quantum electronic devices. Analyzes the simple Lorentzian model of the interaction between electromagnetic waves and optical materials, modified to include necessary quantum concepts. Topics include propagation of electromagnetic waves in isotropic and non-isotropic media (crystal optics); reflection and refraction, polarization and double refraction; optical resonance and stability criteria; Gaussian beam propagation; systems with gain; coherent and non-coherent optical sources; and detection of optical signals. Considers specific devices including resonators, amplifiers, and oscillators; modulators and switches; and optical detectors. *Prereq.* ECE 1364.

4 QH

4 QH

4 QH

4 QH

4 QH

4 QH

ECE 1471 Elements of Power Systems**4 QH**

Introduces electric power systems. Examines steady-state balanced three-phase systems, transmission line constants and system modeling, transmission line equations and line power limitations, and three-phase transformers. Introduces symmetrical components and also includes a high voltage transmission line design. *Prereq.* ECE 1246 or ECE 1217 and ECE 1364.

ECE 1472 Power System Analysis**4 QH**

Presents basic methods for the analysis of power systems, including load flow, symmetrical short circuits, symmetrical component theory and unsymmetrical faults, and elements of power system protection, control, and transient stability. Uses power system software for some system studies. *Prereq.* ECE 1471. ECE 1231 must be taken concurrently.

ECE 1474 Power Electronics**4 QH**

Presents the application of electronics to energy conversion and control. Studies phase-controlled rectifier circuits, DC-DC converters, high frequency inverters, and resonant converters. Illustrates modeling, analysis and control techniques on numerous application examples. Covers design problems including analysis and sizing of passive components (inductors and capacitors) in high-frequency DC/DC switching converters. *Prereq.* ECE 1332 and ECE 1342.

ECE 1486 Numerical Methods and Computer Applications**4 QH**

Presents numerical techniques used in solving scientific and engineering problems with the aid of digital computers. Topics include modeling and simulating of deterministic and probabilistic systems; theory of interpolation; least squares; numerical solution of ordinary and partial differential equations using a programming environment such as MATLAB. Chooses representative problems for solution on a digital computer. *Prereq.* MTH 1225 and GE 1102.

ECE 1501 Capstone Design 1**2 QH**

Requires students to select a project requiring design and implementation of an electrical, electronic, and/or software system, form a team to carry out the project, and submit a detailed proposal for the work. *Prereq.* ECE 1342, ECE 1355, ECE 1364, ECE 1382, and senior standing.

ECE 1502 Capstone Design 2**4 QH**

Requires students to design and implement the project proposed in ECE 1501. Expects students to evaluate progress with interim milestone reports and to present the final design project with written and oral reports. *Prereq.* ECE 1501 taken in previous quarter.

General Engineering

The course descriptions listed under general engineering are intended to show the scope of the subject that will be covered. Since courses are continually updated, specific topics or methods of approach may vary from term to term.

GE 1101 Engineering Problem Solving and Computation**4 QH**

Uses developing and structuring approaches to solve engineering problems. Draws applications from a variety of engineering disciplines which serve as a tool for introducing students to engineering analysis and design. Includes the design of problem-solving algorithms along with an introduction to the "C" programming language.

GE 1102 Engineering Problem Solving with Application Software**2 QH**

Develops fundamental problem solving skills essential to all engineering disciplines. Introduces students to spreadsheet and math application packages and their use in solving engineering problems. Topics include data reduction and transformation, visualization of data and functions, problem structuring, and matrix applications. Examples stress real-life engineering analysis and design as a tool for introducing students to the engineering profession.

GE 1103 Engineering Design**4 QH**

Presents the engineering design process using case studies from a variety of engineering disciplines. Topics include problem formulation and specification, creativity, evaluation tools, patents, product liability, ergonomics, systems design, failure analysis, hazard prevention, manufacturing, ethics in engineering, and presentation techniques. Presents engineering graphics, focusing on developing three-dimensional visualization skills and computer-aided design (CAD) application. Students will develop an original design solution to a technical problem as a term project and use CAD software extensively.

GE 1701 Engineering Problem Solving and Computation (Honors)**4 QH**

Honors equivalent of GE 1101.

GE 1702 Engineering Problem Solving with Application Software (Honors)**2 QH**

Honors equivalent of GE 1102.

GE 1703 Engineering Design (Honors)**4 QH**

Honors equivalent of GE 1103.

Industrial Engineering and Information Systems

IIS 1200 Work Design**4 QH**

Covers the engineering design process, principles of work physiology, and workplace design from the standpoint of employee safety and effectiveness. Covers work measurement techniques, including direct measurement, synthetic standards, and work sampling. Includes a project in which principles of work design must be applied.

IIS 1300 Probabilistic Analysis for Engineers**4 QH**

Presents probability theory axiomatically, with emphasis on sample space presentation of continuous and discrete random variables. Covers descriptive statistics, expected value of random variables, moment generating functions, sampling distribution, and point and interval estimations. *Prereq.* Integral and Differential Calculus.

IIS 1310 Statistics**4 QH**

Examines the definition of a statistic, review of the distributions and approximations of random variables. Introduces hypothesis testing including tests of hypothesis for means, variances, and proportion. Covers nonparametric methods, analysis of variance, and simple linear regression. *Prereq.* IIS 1300.

IIS 1330 Principles of Computation and Programming I**4 QH**

Reviews algorithms, computers, and programming; machine language programming (instruction, execution, and addressing techniques); coding and representation of data; program debugging and verification. Surveys machines, devices, and languages. *Prereq.* Higher-level language.

IIS 1340 Operations Research 1**4 QH**

Covers deterministic models, including LP and duality; transportation and allocation; sensitivity and post-optimality analyses; and network analysis, including maximal flow, shortest route, and PERT. *Prereq.* MTH 1223.

IIS 1341 Operations Research 2**4 QH**

Focuses on the stochastic models in operations research and their analytical development and solution. Topics include queuing models, deterministic and stochastic inventory models, Markov chains, and sequencing. Presents dynamic programming and recursive functional expressions. *Prereq.* IIS 1310.

IIS 1345 Management Information Systems**4 QH**

Examines the design and implementation of computer-based information systems. Topics include the value of information; tools of system analysis and design; impact of computer-based information systems on organizations and society; rudimentary computer architecture; input devices; data organization and storage; system configuration; communications; and output/display devices.

IIS 1350 Digital Simulation Techniques**4 QH**

Covers model design and development, validation, and experimentation for discrete event simulation models. Topics include problem formulation, data collection and analysis, random variable generation, and statistical analysis of output. Utilizes a major simulation language such as GPSS, SIMAN, or SIMSCRIPT. *Prereq.* Higher-level language and IIS 1310.

IIS 1360 Engineering Economy**4 QH**

Familiarizes the student with the theory and techniques of economic design and evaluation of an investment project. Presents steps in the analysis of investment proposals, time value of money, and cash flows. Analyzes cash flows in terms of present worth, annual cost, rate of return, and benefit/cost ratio. Studies effects of taxes on investment analysis. Utilizes mathematical and graphical models to evaluate candidate solutions to design alternatives.

IIS 1366 Engineering Economy**4 QH**

Covers the formulation of analytical techniques, such as rate of return, present worth, and annual cost. Considers the application of these techniques to solve business and engineering problems involving design, selection, replacement, lease-buy decisions, and decisions among multiple alternatives. Studies sources and cost of capital, and the effect of taxes on the selection of investment alternatives. *Not open to industrial engineering majors.*

IIS 1400 Systems**4 QH**

Examines modeling, analysis, and control of linear feedback systems through consideration of the following topics: differential equations as system models; transfer functions and block diagrams; system components and the method of analogies; accuracy, and stability. *Prereq.* MTH 1230.

IIS 1401 Design Project**4 QH**

Examines analysis and design of major industrial engineering systems. Students are expected to undertake up to five projects drawn from line balancing, job shop scheduling, stochastic network analysis, reliability in design, complex queuing system design, sequencing, or other areas of student and faculty interest. *Prereq.* Senior standing.

IIS 1405 Production and Inventory Control**4 QH**

Explores design of basic inventory models and inventory management systems, single-stage and multi-stage systems and their dynamics, production control and aggregate planning, and mathematical and heuristic approaches to aggregate scheduling. Topics include cost structure and decision-oriented analyses, and consideration of job shop scheduling and dispatching problems. *Prereq.* IIS 1310 and IIS 1340.

IIS 1415 Facilities Design**4 QH**

Examines the use of descriptive and optimizing models (for example, simulation, queuing theory, and linear programming) to design facilities and associated materials-handling systems. Applies computer-assisted layout analysis techniques to problems of real-world scope. *Prereq.* IIS 1340.

IIS 1425 Material Handling System Design**4 QH**

Discusses the design and analysis of large material handling systems. Topics include computer control of handling systems, integration with production and inspection, automated storage/retrieval systems, automatic identification systems, and systems acquisitions. *Prereq.* IIS 1340.

IIS 1436 Quality Assurance**4 QH**

Covers basic principles to state-of-the-art concepts and application of statistical process control and design. Applies principles to a variety of products. Topics include measuring and controlling product quality, Shewhart control charts, quality cost, pareto analysis, discrete and variable sampling, and military standards in quality control. *Prereq.* IIS 1310.

IIS 1450 Expert Systems**4 QH**

Introduces students to the theory, topics, and applications of expert systems in engineering. Topics include knowledge representations formats (production rules, frames, networks, and logic systems), heuristics in engineering (deterministic and nondeterministic), fuzzy logic, certainty factors, cognition, memory, decision strategies, design of expert systems, shells, machine learning techniques, current research goals, and applications in engineering. Each student must complete a design project in expert systems development and/or application. *Prereq.* GE 1100, IIS 1300, IIS 1330, or permission of instructor.

IIS 1466 Manufacturing Automation**4 QH**

Familiarizes students with the process of manufacturing and potential for automation. Studies designing for automation including required hardware and software. Involves hands-on experience with robotics programming and implementation, programmable control programming, and CNC machine programming using APT and G code. *Prereq.* IIS 1330 and IIS 1465, or permission of instructor.

IIS 1470 Human Considerations in Engineering Design**4 QH**

Introduces human factors with emphasis on the physiological and anthropometric bases of equipment and workplace design. Topics include an overview of the field of human factors; work, fatigue, and endurance; thermal regulation and heat stress; biomechanics; effects of aging on work capacity; and body response to vibration.

IIS 1475 Human-Machine Systems**4 QH**

Emphasizes human sensory/motor performance, information-processing capabilities, learning, and skilled-task performance. Topics include an introduction to the experiment as a source of knowledge of human performance characteristics; vision, visual performance, and principles of display design; audition, noise,

hearing damage, and auditory signals; information processing; signal detection; aging effects; and system development.

IIS 1777 Honors Adjunct

1 QH

To be added to any 4 quarter hour course in the department when approved by the Honors Committee of the College of Engineering. Once approved, the adjunct information is forwarded to the Honors Office for dissemination to the honors membership. Students may enroll in IIS 1777 an unlimited number of times as it can be an adjunct to any industrial engineering course.

IIS 1800 Independent Study in Industrial Engineering

4 QH

Allows independent study on advanced IE topics for students usually in the senior year and with high scholastic standing. Projects may be of an applied or theoretical nature. A formal report is submitted to student's project supervisor at the end of quarter.

Mechanical Engineering

ME 1201 Statics

5 QH

Examines vector representation of force and moment; equivalent force systems; centroids and centers of gravity; and distributed forces. Investigates equations of equilibrium; free-body diagrams; applications to trusses, pin-connected frames, and beams; shear and moment diagrams; and elementary concepts in friction. Introduces virtual work. *Prereq.* PHY 1222.

ME 1202 Dynamics 1

5 QH

Develops problem-solving ability in the fundamentals of dynamics. Topics include kinematics of particles, kinematics of rigid bodies, and mass moments of inertia. Examines kinetics of particles and rigid bodies using force, mass, and acceleration. *Prereq.* ME 1201.

ME 1203 Strength of Materials 1

5 QH

Explores the concept of stress and strain; state of stress and strain at a point; and stress-strain relations and material properties. Investigates moment of inertia of areas; stress and deformation of simple members under axial and torsional loads; and stresses in symmetrical beam bending. Involves lab sessions to support the lectures. *Prereq.* ME 1201.

ME 1314 Strength of Materials 2

4 QH

Covers asymmetrical bending; analysis of determinate and indeterminate beams by various methods; and buckling of columns. *Prereq.* ME 1203.

ME 1315 Dynamics 2

4 QH

Continues development of problem-solving ability in dynamics. Topics include kinematics of rigid bodies using rotating frames, kinetics of particles and rigid bodies using work and energy, introduction of Lagrange's equations, kinetics of particles and rigid bodies using impulse and momentum, and simple gyroscopic motion. *Prereq.* ME 1202.

ME 1320 Dynamics for Civil Engineers

4 QH

Covers kinematics, translating reference frames, mass moments of inertia, plane motion of rigid bodies, and instantaneous equations of motion. *Prereq.* CIV 1210.

ME 1321 Mechanics for Electrical Engineers

4 QH

Focuses on the study of the mechanics of rigid bodies, instantaneous equations of motion, work and energy, and impulse and momentum. *Prereq.* PHY 1222.

ME 1335 Mechanical Design

5 QH

Covers applications to the design process of the basic concepts of mechanics, strength of materials, and mechanical behavior of materials. Discusses basic considerations in design and its open-ended nature. Reviews fundamentals of stress and deflection analysis; theories of failure; design for fatigue strength; product liability; numerical methods in design, modeling, simulation; and optimization of mechanical systems. *Prereq.* ME 1314.

ME 1336 Design Project 1

5 QH

Applies the engineering sciences to the design of a system, component, or process. Students will choose the particular design project with the approval of appropriate faculty. Design teams will be organized. Each project will include the use of open-ended problems, development and use of design methodology, formulation of design problem statements and specifications, consideration of alternative solutions, feasibility considerations, and detailed system descriptions. It should include realistic constraints (such as economic factors, safety, reliability, maintenance, aesthetics, ethics, and social impact). *Prereq.* ME 1335 and ME 1337.

ME 1337 Thermal Design

5 QH

Focuses on developing the ability of the students to synthesize their knowledge and understanding of the concepts of thermodynamics, fluid mechanics, and heat transfer to meet the specifications of various thermal design objectives through the assignment of open-ended problems. Reviews fundamentals of heat transfer and fluid mechanics, numerical methods in heat transfer, heat transfer analysis of heat exchangers, heat exchanger pressure drop analysis, modeling, system simulation, and topics in optimization. One or more design projects are assigned. Utilizes various software on mainframe and microcomputers throughout the course and in the projects. *Prereq.* ME 1365.

ME 1338 Design Project 2

5 QH

Continues the project started in ME 1336. Students remain in the same group and under the direction of the same faculty advisers as in ME 1336. These guidelines may be waived in exceptional cases with the department chair's approval. *Prereq.* ME 1336.

ME 1340 Thermodynamics

4 QH

Studies the systems in which energy and its flow across systems boundaries are important. In this course, energy, heat, and work are defined and used in the First Law of Thermodynamics. Introduces other thermodynamic properties and equations of state, with emphasis on tabular and graphical forms for simple compressible systems and on the ideal gas. Introduces the Second Law of Thermodynamics and the property entropy, and discusses their macro- and microscopic implications. Concentrates on basic concepts and their proper application to representative engineering systems. *Prereq.* MTH 1223; not open to mechanical engineering majors.

ME 1360 Thermodynamics 1

5 QH

Defines energy, heat, and work in the First Law of Thermodynamics. Introduces other thermodynamic properties and equations of state, with emphasis on tabular and graphical forms for simple and compressible systems on the ideal gas. Discusses phases and phase transitions, and examines energy analysis of both open and closed systems. Introduces macro- and microscopic implications of the Second Law of Thermodynamics and the property entropy, and discusses their macro- and microscopic implications. Emphasizes the macroscopic consequences of irreversibility and the limitation this

places, through the Second Law, on the behavior of engineering systems. This course meets four times weekly and integrates problem-solving strategies while concentrating on basic concepts. *Prereq.* MTH 1223 taken concurrently.

ME 1361 Thermodynamics 2 5 QH

Studies of vapor power systems including the Rankine cycle and its modifications for use with both fossil and nuclear fuels, vapor refrigeration systems, and all-gas cycles including the Brayton cycle and its modifications; the Otto cycle; the Diesel cycle; and supercharging and turbo-charging. Introduces the concepts of availability and irreversibility and thermodynamics of nonreacting mixtures with applications to air/water/vapor mixtures for air-conditioning systems and cooling towers. Discusses the elements of optimum power plant design. *Prereq.* ME 1360.

ME 1362 Thermodynamics 3 5 QH

Continues the thermofluids sequence. Topics include thermodynamic relations using generalized charts; reacting gas mixtures and combustion; and chemical equilibrium. Introduces one-dimensional compressible flow, including isentropic flow with area change; and normal shock waves. Includes a lab. *Prereq.* ME 1361.

ME 1365 Heat Transfer 5 QH

Studies the theories that describe conduction, convection, and thermal radiation heat transfer mechanisms. Discusses steady-state and transient conduction problems in rectangular, cylindrical, and spherical coordinate systems. Studies convective heat transfer mechanisms, and introduces various correlations. Presents a description of thermal radiation heat transfer between surfaces. Includes various lab experiments. *Prereq.* ME 1360, ME 1375, and MTH 1226.

ME 1375 Fluid Mechanics 5 QH

Studies fundamental principles in fluid mechanics. Topics include hydrostatics (pressure distribution, forces on submerged surfaces, and buoyancy); Newton's law of viscosity; dimensional analysis; integral forms of the basic laws (conservation of mass, momentum, and energy); pipe flow analysis; and differential formulation of basic laws with laminar flow analyses. Includes labs and a computer project. *Prereq.* ME 1360 and MTH 1225.

ME 1380 Materials Science 5 QH

Introduces materials science for engineers, emphasizing the structure/property/function relation. Topics include crystallography, structure of solids, imperfections in crystals, phase equilibrium, phase transformations, diffusion, and physical/electrical properties. Includes a lab. *Prereq.* CHM 1132 and ME 1360.

ME 1386 Materials Science 4 QH

Introduces materials science for engineers, emphasizing the structure/property/function relation. Topics include crystallography, structure of solids, imperfections in crystals, phase equilibrium, electrical and magnetic properties of metals, semiconductors and junctions. *Prereq.* CHM 1132.

ME 1392 Measurements and Analysis 5 QH

Examines design of experiments, instrumentation, measurements, data analysis, and report writing. Applies the principles developed in class to a variety of lab experiments. Requires written reports. Topics include force, strain, rotational frequency, temperature, pressure, power, and A/D conversion techniques. Lab fee.

ME 1401 Advanced Strength and Applied Elasticity 4 QH

Covers analysis of curved beams, rings, and thick-walled pressure vessels; introduction to plane elasticity problems using rectangular and polar coordinate systems; and concepts of stress and strength. *Prereq.* ME 1314.

ME 1408 System Analysis and Control 4 QH

Explores the theoretical background necessary to analyze and design simple linear control systems. Focuses on system modeling, linear approximations and their limitations, transfer functions, and block diagrams; transient and frequency response; and stability. Discusses frequency domain and root locus techniques. *Prereq.* ME 1315.

ME 1415 Mechanical Vibrations 5 QH

Studies free and forced vibrations of undamped and damped one-degree-of-freedom systems. Includes rotational unbalance, support motion, vibration isolation, vibration measuring equipment, non-viscous damping, general periodic excitation, non-periodic excitation using numerical methods. Examines free and forced vibration of multi-degree-of-freedom systems, the vibration absorber, coordinate coupling, and normal modes of vibration. *Prereq.* ME 1202.

ME 1435 Computer-Aided Design 4 QH

Introduces the concepts of computational and numerical geometry for design. Includes the implementation of computer graphics in design and use of computer-aided design packages. Covers principles of numerical control techniques to design and manufacture. Requires a design project. *Prereq.* GE 1103 and ME 1314.

ME 1436 Advanced Computer-Aided Design 4 QH

Covers advanced applications of interactive graphics concepts to different engineering tasks including animation; solid modeling; numerical control; mass properties; finite element modeling and analysis; and other traditional engineering analysis. Presents advanced concepts and features of interactive graphics and analysis programming languages. Includes FORTRAN interface and CAD/CAM packages to give students hands-on experience in lab settings. Requires a design project. *Prereq.* ME 1435.

ME 1470 Fluid Mechanics 2 4 QH

Covers velocity potential and stream functions; circulation and Kelvin's theorem; two-dimensional, steady irrotational incompressible flow; and Karman-Pohlhausen method applied to two-dimensional boundary layers. *Prereq.* ME 1375.

ME 1473 Gas Dynamics 4 QH

Focuses on application of the principles of fluid mechanics to compressible flows. Discusses wave propagation and the concepts of sound speed and Mach number. Emphasizes one-dimensional steady flows including the effects of area change, friction, and heat transfer. Considers normal shock waves and the possibility of choking. *Prereq.* ME 1375.

ME 1480 Mechanical Behavior of Materials 4 QH

Studies the physical basis for the mechanical behavior of solid materials, including elasticity, plasticity, viscoelasticity, and fracture. Discusses structural alloys and polymers. *Prereq.* ME 1203 and ME 1380.

ME 1483 Materials Processing 4 QH

Surveys the essential features and materials limitation of various methods for processing materials. Topics include heat treatment (ferrous and nonferrous alloys), casting, forming, joining, and machining. *Prereq.* ME 1380.

ME 1490 Special Topics

When offered, topics will vary depending on the interests of a group of students and/or of the department. *Prereq. Permission of the department.*

4 QH**ME 1496 Mechanical Engineering Project 1**

Involves a project of an analytical or experimental nature. Each student must, before the end of the first week of the quarter, obtain written approval for a proposed project from the department chair and a department faculty member under whom the student will work. A formal report must be submitted to the faculty supervisor at the end of the quarter. *Prereq. Senior standing.*

4 QH**ME 1497 Mechanical Engineering Project 2**

Continues ME 1496. *Prereq. ME 1496.*

4 QH**ME 1545 Internal Combustion Engines**

Presents the concepts and theories of operation of internal combustion engines based upon the fundamental engineering sciences of thermodynamics, gas dynamics, heat transfer, and mechanics. Discusses the design and operating characteristics of conventional spark-ignition, compression-ignition, Wankel, and stratified charge spark-ignition engines. Includes performance analysis using computer programs and Newhall-Starkman charts. *Prereq. ME 1362.*

4 QH**ME 1580 Engineering Materials**

Discusses the utilization of materials science in the application and selection of materials. Topics include reactions with environment, such as oxidation and corrosion; materials selection criteria; and materials engineering case studies dealing with materials selection and failure analysis. *Prereq. ME 1380.*

4 QH**ME 1702 Dynamics 1 (Honors)**

Honors equivalent of ME 1202. The honors section will meet as a separate recitation section for additional lectures and other activities related to the theory and applications of dynamics. *Prereq. ME 1201.*

5 QH**ME 1703 Strength of Materials 1 (Honors)**

Honors equivalent of ME 1203. The honors section meets separately for lab and other activities related to the theory and applications of strength of materials. *Prereq. ME 1201.*

5 QH**ME 1760 Thermodynamics 1 (Honors)**

Honors equivalent of ME 1360. The honors section will meet as a separate recitation section for additional lectures and other activities related to the theory and applications of thermodynamics. *Prereq. MTH 1223 taken concurrently.*

5 QH**ME 1765 Heat Transfer (Honors)**

Honors equivalent of ME 1365. The honors section meets separately for lab and other activities related to the theory and applications of heat transfer. *Prereq. ME 1360, ME 1375, and MTH 1226.*

5 QH**ME 1777 Honors Adjunct**

To be added to any 4 QH course in the department when approved by the Honors Committee of the College of Engineering. Once approved, the adjunct information is forwarded to the honors office for dissemination to the honors membership. Students may enroll in ME 1777 an unlimited number of times as it can be an adjunct to any mechanical engineering course.

1 QH**ME 1796 Undergraduate Honors Thesis 1**

Involves an analytical or experimental project. Before the end of the first week of the quarter, each student must obtain written approval for a proposed project from a department faculty member under whom the student will work and from the College of Engineering's Honors Committee. A formal report must be submitted to the faculty supervisor at the end of the quarter. *Prereq. Junior or senior standing in the honors program.*

4 QH**ME 1797 Undergraduate Honors Thesis 2**

Continues ME 1796. *Prereq. ME 1796.*

4 QH

Engineering Technology

Computer Technology

CT 1150 Computer Organization

4 QH

Presents basic computer architecture. Topics include number systems' operation and conversion, logic circuits, registers, data busses, ROM/RAM, microcomputer structure and operation, microprocessor internal components, microprocessor programming, and input/output processing.

CT 1311 Programming with C++ Language

4 QH

Teaches C++ as a general purpose language suitable for operating systems, and introduces concept of object-oriented programming. Covers global variables, scope rules, pointers, structures, singular linked lists, concepts of abstraction, objects, polymorphism, and class inheritance. *Prereq. GET 1100.*

CT 1330 Data Structures

4 QH

Introduces methods of representing and manipulating data in computer memory. Topics include stacks, queues, lists, trees, heaps, sets, graphs, searching, and sorting. *Prereq. CT 1311.*

CT 1335 Numerical Methods

4 QH

Presents computer methods for solving mathematical problems. Involves writing and running application programs using the University's computer facilities. Covers deterministic versus stochastic methods, random number generators, iterative versus noniterative solutions, maxima and minima in two and three variables, curve fitting in two and three variables, integrals, trapezoidal and Simpson's rules, slopes, difference equations in two and three variables, vector and matrix algebra, simultaneous linear equations, nonlinear equations, permutations, and combinations. *Prereq. CT 1311 and MTH 1195.*

CT 1340 Software Engineering Design

4 QH

Offers structured methods for developing complex computer software. Provides students the opportunity to develop structured specifications, structured designs, and computer programs for complex problems and to test those programs using the University's computers. Topics include partitioning, hierarchical organization, data flow diagrams, data dictionaries, structured English, decision trees, decision tables, structured charts, team design, structured programs, and maintainability. *Prereq. CT 1330.*

CT 1345 Assembly Language

4 QH

Teaches typical microprocessor assembly language. Involves writing and running programs on a 68000 microprocessor-based system. Covers CPU architecture, instruction sets, addressing modes, binary operation, code conversion, subroutines, macros, and input/output. *Prereq. CT 1311 and CT 1150.*

CT 1348 LISP

4 QH

Introduces an interactive language in which the LISP interpreter is commonly referred to as the read-evaluate-print loop. Discusses LISP's various levels of implementation in detail. Explores LISP as an excellent medium for implementing standard techniques in data-structure manipulation, techniques for recursion, complex data structures, storage management, and symbol-table manipulation. *Prereq. CT 1330.*

CT 1351 Advanced Computer Organization

4 QH

Examines the functional characteristics of complex and special-purpose computer systems, the functions of a general-purpose multiuser, and a multiprocessing operating system. Advanced topics include virtual memory and virtual machine architectures, distributed and multiprocessor systems, array processors, and system performance analysis. *Prereq. CT 1356 and CT 1375.*

CT 1355 Microprocessor Peripheral Hardware

4 QH

Covers the elements of microprocessor peripheral hardware and its interfacing. Involves designing and analyzing microprocessor systems, including detailed schematics, timing diagrams, and technical documentation. Topics include serial input/output devices, DMA and interrupt control devices, standard busses, bus arbitration techniques, and bus support VLSI. *Prereq. CT 1374.*

CT 1356 Complex Peripheral Hardware

4 QH

Studies the interfacing and implementation of complex peripheral systems. Topics include disk and tape interfaces, graphic display devices, communication interfaces and subsystems, and input/output processors. *Prereq. CT 1355.*

CT 1360 Industry Software

4 QH

Surveys current commercial software packages and methods. Involves the exercise of commercial packages implemented on the University's computer facilities where applicable. Topics include specific current packages and methods drawn from the categories of database management, scientific and statistical analysis, security and privacy, software assurance, and documentation. *Prereq. CT 1381.*

CT 1363 Concurrent Programming

4 QH

Examines the principles of concurrent programming. Involves writing and running programs to demonstrate aspects of concurrent programming techniques and issues. Explores correctness of concurrent programs, material exclusion, the timing of Dekker's algorithms, the producer-consumer problem, monitors, semaphores, "Ada Rendezvous," critical regions, and conditional variables. *Prereq. CT 1330 and CT 1340.*

CT 1365 Industry Hardware

4 QH

Discusses the latest industrial developments and trends in computer hardware. Conducted as a seminar. *Prereq. CT 1356.*

CT 1368 Semiconductor Logic

4 QH

Analyzes the bipolar and MOS transistors in saturated and cutoff conditions. Examines implementing these concepts to form basic logic circuits and standard logic families, and to convert logical expressions into hardware configuration representations. Topics include Ebers-Moll modeling, PMOS, NMOS, CMOS, bipolar characteristics, and standard logic families. *Prereq. EET 1152.*

CT 1369 Computer Logic

4 QH

Introduces the hardware building blocks of digital computers. Teaches students to specify configurations of gates and memory components to achieve combinational and sequential composite logical functions, and perform finite state machine design and analysis. Topics include gates, flip-flops, registers, decoders, ALUs, memory arrays, and synchronous and asynchronous state machines. *Prereq. CT 1368.*

CT 1374 Introduction to CPU Hardware**4 QH**

Introduces the circuits and operation of a microcomputer. Studies the microprocessor and its basic support components and circuits, including detailed timing and functional analysis of their interactions. Topics include central processing unit, memory, addressing, clocking, bus concepts, interrupts, coprocessors, input/output, and instruction timing. *Prereq.* CT 1345 and CT 1368.

CT 1375 CPU Architecture**4 QH**

Presents high performance microprocessor architecture and hardware interfacing techniques. Analyzes current commercial processors and their support components. Topics include internal CPU architecture, memory management, instruction prefetch, privilege states, bus cycles, control lines, input/output, interrupts, exceptions, and pipelining. *Prereq.* CT 1374.

CT 1377 VLSI Design**4 QH**

Introduces Very Large Scale Integration (VLSI) integrated circuits (ICs), the key components of all modern computers. Examines MOS devices, circuits, design methods, and fabrication techniques used in producing custom VLSI ICs. Topics include MOS transistor characteristics; basic gate circuits; scaling; layout tools, both manual and automated; wafer-fabrication techniques; standards; testing; and costs. *Prereq.* CT 1369.

CT 1380 Data Communication Methods**4 QH**

Discusses the ISO Open Systems Interconnect model for communication systems, including the functional and operational aspects of data communication devices and software. Uses a black box approach. Topics include modems, control units, multiplexers, concentrators, front-end processors, and error checking. *Prereq.* CT 1375.

CT 1381 Operating Systems**4 QH**

Introduces the basic principles and organization of operating system implementation. Topics include processor management, process multiplexing and synchronization, schedules, atomic operations and mutual exclusion, sequential and concurrent programming, memory, and device and data management. *Prereq.* CT 1330.

CT 1383 Databases**4 QH**

Examines database organization structure and management. Involves writing and running programs exemplifying techniques developed in class, using the University's computer facilities. Topics include access methods, attributes, indices, keys, querying, searching and matching, file sets, inverted file sets, normal forms, and random access. *Prereq.* CT 1330.

CT 1387 Bit-Slice Microcomputers**4 QH**

Demonstrates the basic design ground rules common to the bit-slice CPU style of hardware design. *Prereq.* CT 1355.

CT 1389 Single-Chip Microprocessors**4 QH**

Explains the hardware limitations of a single-chip system. When small 8-bit intelligent devices are rewired in high volume, the single-chip microprocessor in the form of the 3870, 8084 ZS, and others comes into play. *Prereq.* CT 1374.

CT 1390 Special Problems in Computer Technology**4 QH**

Students perform theoretical or experimental work under individual faculty supervision. *Prereq.* Permission of department chair.

CT 1391 Topics in Computer Technology**4 QH**

Focuses on advanced topics in Computer Technology to be selected by the instructor. *Prereq.* Permission of the instructor.

CT 1393 UNIX Operating System**4 QH**

Surveys advanced topics related to UNIX and its filing system. Studies the advance features in the editor and system utilities as well as the general theory of an operating system with emphasis on the relationship between the kernel, filing system, and standard libraries. Discusses low level I/O, forks, pipes, and signaling and introduces the use of *nroff*, *sed*, *lint*, *cc*, *lex*, and *yacc*. *Prereq.* CT 1330.

CT 1395 Computer Security**4 QH**

Focuses on issues related to security in computing, including the history of security, encryption techniques and applications, secure communications, and software protection. Covers software verification and validation, security design in hardware, and products currently available for recurring systems and data. Discusses privacy as well as reliability. *Prereq.* CT 1380.

CT 1396 PROLOG: An Introduction to Artificial Intelligence**4 QH**

Introduces fundamental artificial intelligence (AI) terms and techniques using PROLOG as a programming language. Topics include knowledge representation, search, parsing, logic, and inference techniques. Uses student projects as an integral part of the course. *Prereq.* CT 1330.

CT 1397 Advanced UNIX Programming**4 QH**

Studies the design and development of C application programs that interface with the UNIX operating system kernel. Enables C programmers to interact with the UNIX operating system through system calls and library routines. Topics include system programming tools, fundamental concepts, file creation and access, signal and signals handling, multitasking, file and terminal I/O, process creation and programming execution, and forms of interprocess communication and synchronization (pipes, message queues, semaphores, and shared memory). Students use the University's computer facilities to prepare course assignments. *Prereq.* CT 1393.

CT 1480 Local Area Networks 1**4 QH**

Introduces local area network (LAN) concepts, architectures, application, protocols, and components. Focuses on first three layers of the ISO reference model: physical, data line, and network layers. Examines Ethernet, SNA, Token Bus, Token Ring, and other IEEE standards. *Prereq.* CT 1380. *Not open to students who have taken CT 1379.*

CT 1481 Local Area Networks 2**4 QH**

Examines the upper four layers of the ISO reference model; transport, session, presentation and application layers. Topics include TCP/IP, DECNET, NETBIOS, FTP, TELNET, and E-MAIL. *Prereq.* CT 4480 or CT 1480.

CT 1492 Independent Study in Computer Technology**4 QH**

Independent study of advanced computer technology projects for students usually in the upper junior or senior year having high scholastic standing. Projects may be of an applied or theoretical nature resulting in a formal report submitted to the project supervisor at the end of the quarter. *Prereq.* Permission of advisor and project supervisor.

Electrical Engineering Technology

EET 1151 Circuit Analysis 1

4 QH

Examines Ohm's law, Kirchhoff's current and voltage laws, equivalent resistances, independent and dependent sources, mesh and nodal analysis, and power relations, all concentrating on direct current circuits. Other topics include Thevenin and Norton theorems, the operational amplifier, and energy storage elements such as capacitors and inductors. *Prereq. MTH 1193 or PHY 1193.*

EET 1152 Circuit Analysis 2

4 QH

Studies time domain (transient) analysis of R, L, and C elements; energy storage in L and C circuits; and responses in source-free RL and RC circuits. Includes application of the unit step function and response of RLC circuits. Introduces frequency domain methods to solve sinusoidal steady-state circuits using complex frequency concepts and phasor algebra. *Prereq. EET 1151.*

EET 1310 Electrical Measurements

4 QH

Covers standards of measurements, dimensional analysis, errors and measurement of dispersed data, discrete and continuous variables, binomial distribution, and normal distribution. Topics include guaranteed error, methods of resistance measurements, digital voltmeters and analog-to-digital conversion, voltage references, and potentiometers and AC bridges. *Prereq. EET 1353.*

EET 1311 Electronics 1

4 QH

Introduces elements of digital electronics, starting with the binary number system and proceeding to Boolean algebra and DeMorgan's theorems. Discusses combinatorial logic in detail and the basic circuitry to realize AND, OR, and NOT devices. Gives an introduction to sequential logic and the bistable devices required to realize it. Proceeds to the basic sequential circuits such as counters and shift registers. Includes the analysis and design of both combinatorial and sequential circuits. *Prereq. EET 1152.*

EET 1312 Electronics 2

4 QH

Reviews the theory of linear circuits and extends it to simple non-linear circuits of both the two-terminal variety and the three-terminal variety. Considers the solid-state theory of the PN diode as an example of the two-terminal non-linear device, and the NPN, PNP, and field-effect devices as examples of the three terminal non-linear elements. Includes light-sensitive and heat-sensitive solid-state devices. Considers the problem of selecting an operating point for a non-linear device, and the corresponding practical methods of providing the required biases. Introduces the small-signal linear model for the non-linear device in the vicinity of the operating point. *Prereq. EET 1152, PHY 1193.*

EET 1313 Electronics 3

4 QH

Reviews small-signal models for three-terminal devices and discusses frequency response of such models, including the Bode asymptotic approximation to frequency response. Also reviews Mason's signal flow graph concepts for determining transfer functions. Examines operational amplifiers including their ideal behavior and the limitations introduced by finite input and output impedances, finite gain, and finite bandwidth. Explores feedback and stability problems that can occur when using operational amplifiers. Studies applications of feedback to oscillators and active filters. *Prereq. EET 1312.*

EET 1314 Pulse and Digital 1

4 QH

Reviews the basic concept of Boolean algebra, combinatorial logic, and binary arithmetic, and extends them to the design of coding systems such as binary, binary-coded decimal, Gray code, seven-segment displays, and multiplexers. Introduces flip-flops and sequential logic circuits such as ripple counters, synchronous counters, ring counters and Johnson counters, shift registers, solid-state memory devices, and the 555 timer. Emphasizes design of digital systems using the available microelectronic gates, primarily in the TTL series. *Prereq. EET 1313.*

EET 1315 Pulse and Digital 2

4 QH

Examines the physical devices that are used to realize digital circuits, as a complement to the previous treatment of idealized mathematical models. Introduces the concepts of rise-time, fall-time, set-up time, hold time, delay time, and the maximum frequency of a clock. Discusses the presently available logic families such as TTL, CMOS, and EC, compares them, and considers the problems of interconnecting them. Introduces memory elements and field-programmable logic elements. Presents interfacing devices such as analog-to-digital and digital-to-analog converters. *Prereq. EET 1314.*

EET 1317 Principles of Communication Systems 1

4 QH

Focuses on signal analysis using Fourier methods, noise in communication systems, frequency selective amplifiers, including wideband, transistor power amplifiers AF and RF, oscillators, and signal sources and applications. *Prereq. EET 1313.*

EET 1318 Principles of Communication Systems 2

4 QH

Explores basic theory of amplitude, frequency, phase and pulse code modulated systems, analysis of modulating and demodulating circuits. Topics include carrier systems using SSB, system block and level diagrams, logic control circuits in communication systems, and modems. *Prereq. EET 1317.*

EET 1319 Principles of Communication Systems 3

4 QH

Emphasizes the fundamentals of digital communications, sampling requirements, analog-to-digital conversion methods, and system capacity and bandwidth. Topics include comparison of practical digital systems PAM, PCM, PFM, PWM, time and frequency division multiplexing, data decoding, and selected examples from telemetry and computer links. *Prereq. EET 1318.*

EET 1320 Electricity and Electronics 1

4 QH

Introduces circuit analysis, resistive networks, periodic excitation function, steady state AC circuits, the physical foundations of electronics, and the physical operation of electronic devices. *Prereq. MTH 1193 and PHY 1193. Not open to electrical engineering technology majors.*

EET 1321 Electricity and Electronics 2

4 QH

Examines single-stage electronic circuits, magnetic circuits and transformers, electro-mechanical energy conversion, DC machines, and AC machines. *Prereq. EET 1320.*

EET 1323 Electronic Laboratory

2 QH

Offers experiments with nonlinear semiconductors. Explores junction and zener diodes. Studies typical applications in clippers, clampers, rectification, filtering, electronic power supplies, voltage regulation, and integrated circuit regulators. Discusses bipolar and field effect transistors, amplifiers and voltage follower configurations, special semiconductors, and operational amplifiers. *Prereq. EET 1311.*

EET 1324 Circuits Laboratory 1**2 QH**

Offers experiments in DC electrical circuits and measurement techniques. Includes use of ammeters, ohmmeters, voltmeters, VOMs, and power supplies. Studies equivalent resistance, series and parallel circuits, Ohm's law, Thevenin and Norton theorems, and superposition and maximum power transfer theorems. *Prereq.* EET 1151.

EET 1325 Circuits Laboratory 2**2 QH**

Offers further experiments in electrical circuits and measurement techniques. Includes operation of oscilloscopes, audio frequency, and function generators. Explores inductance and capacitance, and the effect of frequency upon them. Studies amplitude, frequency, and phase shift measurements using a variety of series/parallel RL, RC, and RLC circuitry. Examines circuit time constants and their relation to repetition rate, along with resonance, circuit quality, and filter circuits. *Prereq.* EET 1124.

EET 1327 Advanced Electronics Laboratory 1**2 QH**

Offers experiments using oscilloscopes, the examination of transistor audio amplifiers, push-pull amplifiers, drivers, pulse and video amplifiers. Topics include transients and wave-shaping circuits, audio frequency oscillators, and the study of operational amplifiers. *Prereq.* EET 1323.

EET 1328 Advanced Electronics Laboratory 2**2 QH**

Experiments with the modulation of a class C amplifier, the diode detector, basic timing circuits, RF and crystal oscillators, astable multivibrators, logic gates, flip-flops, binary adders, registers and counters. Topics include active filters, frequency modulation detectors, and analog-to-digital and digital-to-analog conversion. *Prereq.* EET 1327.

EET 1329 Advanced Electronics Laboratory 3**2 QH**

Studies FM and PM waves, amplitude limiters, the balanced modulators and single sideband generators. Discusses integrated circuit timers and monolithic random access memory, and monolithic phaselocked loop, as well as a series of microwave experiments and digital experiments. *Prereq.* EET 1328.

EET 1330 Energy Conversion**4 QH**

Investigates generalized theory of rotating energy conversion devices, steady-state operation of the multiply-excited direct-current machine, control of speed, special machines, transformers, steady-state considerations of induction and synchronous machines. Explores the generalized machine and circuit model, and Laplace transform techniques applied to the analysis of dynamic operating modes of rotating machines. *Prereq.* EET 1152 and MTH 1195.

EET 1337 Distributed Systems**4 QH**

Examines radiation, transmission, and reception of electromagnetic waves, distributed-line constants and traveling waves of transmission lines, and differential equations of the uniform line. *Prereq.* MTH 1195 and PHY 1193.

EET 1353 Circuits Analysis 3**4 QH**

Introduces three-phase circuits and three-phase, single-phase systems. Examines the application of differential equations to the solutions of linear, time-invariant electrical networks. Introduces singularity functions, convolution, and time domain transient analysis; network topology and duality; and the methods of transformation calculus and complex frequency concepts. *Prereq.* EET 1152.

EET 1354 Circuits Analysis 4**4 QH**

Explores the Bode asymptotic frequency response approximation and the concept of Mason's signal flow graphs. Focuses on signal analysis in the frequency domain, Fourier series, Fourier and Laplace transform methods, and a varied selection of circuit problems using Laplace transforms and related theorems. *Prereq.* EET 1353.

EET 1360 Engineering Analysis 1**4 QH**

Studies linear algebra and circuit equation applications, as well as solution of linear differential equations, including an introduction to Laplace transforms. *Prereq.* EET 1152 and MTH 1195.

EET 1362 Basic Power Systems 1**4 QH**

Focuses on power transmission lines, line constants, current voltage and power relations, electric-power distribution loads, feeders, and substations, and application of matrices. *Prereq.* EET 1354.

EET 1363 Basic Power Systems 2**4 QH**

Investigates symmetrical and asymmetrical faults, protective devices—application and coordination, power flow in electric circuits, steady-state power limitations of systems, and voltage regulation theory and application. *Prereq.* EET 1362.

EET 1364 Basic Power Systems 3**4 QH**

Offers computer applications to power systems with emphasis on load-flow studies, basic ideas of systems planning, short-circuit studies, and system stability. *Prereq.* EET 1363.

EET 1370 Digital Computers 1**4 QH**

Introduces digital computer design. Topics include general computer organization, number systems and number representations, design characteristics of major computer units, and Boolean algebra applications to computer design. *Prereq.* EET 1311.

EET 1371 Digital Computers 2**4 QH**

Examines microprocessor architecture and organization. Studies the machine language and assembly coding of an industry-accepted microprocessor, and a suitable topic from the current literature. Assembly language coding problems assigned. *Prereq.* EET 1370.

EET 1377 Control Engineering 1**4 QH**

Analyzes linear servomechanisms under both transient and steady-state conditions, signal flow graphs, and Laplace transforms in the formulation of block diagrams and transfer function. *Prereq.* EET 1354 and MTH 1195.

EET 1378 Control Engineering 2**4 QH**

Focuses on system stability, root locus techniques, and treatment of Nyquist criteria and Bode diagram methods for systems evaluation. *Prereq.* EET 1377.

EET 1390 Optical Instrumentation**4 QH**

Focuses on telescopes, microscopes, and similar equipment, as optical system components. Includes magnification, aberrations, resolution criteria, photometry, compatibility of system components and optimization of systems, and the basic nonimage-forming systems used for analysis control and metrology. *Prereq.* MTH 1192 and PHY 1193.

EET 1399 Special Problems in Electrical Engineering Technology**4 QH**

Offers theoretical or experimental work under individual faculty supervision. *Prereq.* Permission of department chair.

General Engineering Technology

GET 1100 Computer Programming for Engineering Technology 4 QH

Introduces computers for problem solving using C++ language. Topics include data types, arithmetic and logical expressions, programming loops, decision making, functions, arrays, and character string manipulation. Offers the use of the University's computer facility to run programs. *Prereq.* MTH 1191 or taken concurrently.

GET 1105 Computer Applications for Tech 4 QH

Studies the basics of computing in a microprocessor environment (DOS, Windows, MAC, word processing, databases, spreadsheets) with emphasis on applications relevant to technology students. Provides a solid foundation upon which students can develop more extensive computer expertise. Acquired skills are transferable to subsequent courses; cooperative education assignments; and personal and professional endeavors.

GET 1170 Engineering Graphics 1 4 QH

Introduces manual and computer engineering drawing using geometric constructions, charts, and graphs. Geometric construction includes descriptive geometry, orthographic projection, sections, and isometric drawing.

GET 1171 Engineering Graphics 2 4 QH

Studies computer and manual drawing in layout and assembly graphics. Topics include manufacturing processes, fasteners, gears, welding, electric/electronic drawing, architectural/structural drawing, piping, and topography. Design project required. *Prereq.* GET 1170 or equiv.

GET 1320 Engineering Ethics 1 1 QH

Uses a case-study approach to examine basic ethical issues likely to confront engineering students on co-op and in their after-graduation professional practice. Attention is given to issues such as licensing, dissent with management, employee responsibilities, trade secrecy versus publication rights, advertising, and product liability. Discusses these issues in the context of the codes of engineering ethics of the engineering societies and general ethical theory. *Prereq.* Middler standing or permission of instructor.

GET 1356 Engineering Economy 4 QH

Presents fundamental accounting concepts and terminology, including assets, liability, net worth, and analyzing income statements and balance sheets. Discusses introductory steps in analyzing investment proposals, time value of money, and cash flows. Analyzes cash flows in terms of present worth, annual worth, rate of return, and benefit/cost ratio. Considers depreciation and tax effects on cash flows. *Prereq.* MTH 1191.

GET 1364 Kinematics 4 QH

Studies four-bar linkages, sliders, and others, using orthogonal components of vectors, instantaneous centers, equivalent linkages, and effective cranks. Emphasizes graphic solutions and introduces the computer as a tool to enhance these concepts. Analyzes reverted and epicyclic gear trains and cam displacement. *Prereq.* GET 1171 and PHY 1191.

Mechanical Engineering Technology

MET 1301 Mechanics A 4 QH

Explores forces, moments, couples, statics of particles, and rigid bodies in two- and three-dimensions. Examines external and internal distributed forces, first moments and centroids, and structures such as trusses, frames, and machines. *Prereq.* MTH 1193, PHY 1191.

MET 1302 Mechanics B 4 QH

Emphasizes friction, second moments, kinematics of particles, rectilinear and curvilinear motion of dynamic particles. Topics include force, mass and acceleration, and work and energy. *Prereq.* MET 1301.

MET 1303 Mechanics C 4 QH

Studies impulse and momentum of particles. Topics include kinematics and dynamics of rigid bodies: force, mass, and acceleration; dynamics of rigid bodies: work and energy, and impulse and momentum; and introduction to mechanical vibration. *Prereq.* MET 1302.

MET 1314 Stress Analysis A 4 QH

Investigates axially loaded members, stress and strain, allowable stresses, factor of safety, temperature effects, and indeterminate members. Topics include centric loading of bolted and welded connections, shear and moment in beams, eccentrically loaded connections, and flexural and transverse shearing stresses in beams. *Prereq.* MET 1301.

MET 1315 Stress Analysis B 4 QH

Discusses beam deflections and reactions by various methods, theorem of three moments and torsional stresses and strains. Topics include pressure vessels, power transmission, eccentric loads on struts, beams, riveted and welded joints, combined and principle stresses, Mohr's circle, and theories of failure. *Prereq.* MET 1314.

MET 1319 Mechanics 4 QH

Introduces mechanics to nonmechanical majors. Topics include statics of particles and rigid bodies, and kinematics and kinetics of particles and rigid bodies. *Prereq.* MTH 1193 and PHY 1191.

MET 1330 Mechanical Design A 4 QH

Introduces mechanical design, the design process, design factors, creativity, optimization, human factors, and value engineering. Discusses and develops principles through simple design projects. Topics include principles of design, properties and selection of materials; stress concentrations; strength under combined stresses; theories of failure; and impact, fluctuation, and repeated loads. *Prereq.* MET 1315, MET 1380.

MET 1331 Mechanical Design B 4 QH

Explores stresses, deformation and design of fasteners, screws, joints, springs, and bearings, lubrication, and journal bearings. Topics include stresses and power transmission of spur, bevel, and worm gear, shaft design, and clutches and brakes. Emphasizes group design projects. *Prereq.* MET 1330.

MET 1340 Thermodynamics A 4 QH

Introduces general theory of heat and matter, laws of thermodynamics, energy-transformation principles, availability of energy, properties and processes for pure substances and ideal gases.

Topics include thermodynamic properties and processes of liquids and vapors, tables and charts, mixtures of fluids, and vapor cycles. *Prereq.* PHY 1192.

MET 1341 Thermodynamics B 4 QH

Discusses theory and analysis of actual engine types using gas and internal combustion engines, theory of gas and vapor flow through orifices and nozzles, and principles of gas compression. Includes analysis of gas turbine cycles, steam power cycles, con-generation systems, and introduction to air-conditioning and refrigeration systems. *Prereq.* MET 1340.

MET 1342 Refrigeration and Air-Conditioning 4 QH

Focuses on air-conditioning principles, including psychometrics and heat pumps. Examines calculation of heating and cooling loads in accordance with ASHRAE practices, principles of gas compression, analysis of vapor compression, refrigeration systems, low-temperature refrigeration cycles, and absorption refrigeration systems. *Prereq.* MET 1341.

MET 1343 Heat Transfer 4 QH

Presents the principles of heat transfer: thermal conductivity and thermal conductance/resistance. Examines heat transfer mechanisms, equations of conduction, and natural and forced convection. Covers emissivity and absorptivity, radiation between simple bodies, heat transfer coefficients, heat changer effectiveness, and heat exchanger design and selection. *Prereq.* MET 1341.

MET 1370 Fluid Mechanics A 4 QH

Investigates hydrostatics, principles governing fluids at rest, pressure measurement, hydrostatic forces on submerged areas and objects, and simple dams. Topics include fluids in moving vessels, hoop tension fluid flow in pipes under pressure, fluid energy, power, and friction loss, Bernoulli's theorem, and flow measurement. *Prereq.* MET 1302.

MET 1371 Fluid Mechanics B 4 QH

Explores pipe networks and reservoir systems, flow in open channels, uniform flow, energy, friction loss, minor losses, and velocity distribution. Topics include alternate stages of flow, critical flow, nonuniform flow, and accelerated and retarded flow. *Prereq.* MET 1370.

MET 1380 Materials A 4 QH

Introduces fundamental metallic structures, general metallurgic information covering polymer, ceramic, composite, and properties, testing, and failure of metals. Topics include alloying and hardening of metals, refinement of metals, equilibrium diagrams, characteristics of engineering metals, and selection of materials for engineering applications.

MET 1390 Measurement and Analysis Laboratory 2 QH

Offers experiments for the collection and analysis of data by graphical and numerical methods including computer applications, report writing that draws conclusions relative to accuracy, precision, true values, and measured values as they relate to basic mechanical measuring instruments for rotational frequency, specific gravity, pressure, temperature, and time as these parameters are utilized in making mechanical measurements. *Prereq.* GET 1100, MET 1314, MTH 1195, and PHY 1193.

MET 1391 Technology Laboratory A 2 QH

Presents experiments to determine mechanical properties of materials under tensile, compressive, torsional, direct shear, flexural, impact, fatigue, and creep loading conditions as they are affected by normal and abnormal environmental conditions; also as they are affected by homogeneity, nonhomogeneity, isotropy, and nonisotropy. *Prereq.* MET 1315, MET 1380, MET 1390, or taken concurrently.

MET 1392 Technology Laboratory B 2 QH

Offers experiments to determine the physical properties of incompressible fluids and to measure the flow rates and velocities utilizing pilot tubes, orifice plates, venturii and weirs flow meters, U-tube differential manometers, and piezometers as the fluid flows through open channels, partially filled conduits, conduits under pressure, pipe networks, turbines and pumps. *Prereq.* MET 1390, MET 1370, or taken concurrently.

MET 1393 Technology Laboratory C 2 QH

Explores basic thermodynamic relations. Experiments examine the flow of compressible fluids and steam and the energy conversion of a fuel into a working substance and the related heat-transfer mechanisms. Discusses operating characteristics of thermal generators, engines, and compressors. *Prereq.* MET 1390, MET 1341, or taken concurrently.

MET 1394 Technology Laboratory D 2 QH

Presents experiments to examine the operating characteristics and efficiencies of internal combustion engines, brake horsepower, indicated horsepower, friction horsepower, and mean effective pressure. Topics include fuel consumption, torque, ignition timing, manifold pressure, and compression ratios and internal engines as energy conversion systems, and energy conversion of fuels. *Prereq.* MET 1341, MET 1343, MET 1393, or taken concurrently.

MET 1395 Technology Laboratory E 2 QH

Offers experiment, analytical, and design projects to examine mechanical engineering concepts. *Prereq.* MET 1342, MET 1343, and MET 1390.

MET 1396 Machine Shop 4 QH

Introduces the study of machines for metal processing, cutting tools, and fluids, machinability, and automatic machinery.

MET 1414 Mechanical Vibrations 4 QH

Examines elements of vibrating systems, one degree of freedom (undamped free and forced vibration from Newton's law of motion and energy methods), natural frequencies, and damped free and forced vibration. Topics include design of vibration mounts for mechanical equipment, modeling of vibrational systems, shock testing, and computer applications. Laboratory experiments are included. *Prereq.* MET 1303.

MET 1416 Stress Analysis C 4 QH

Discusses curved beam, asymmetrical bending of beams, shear-center and shear stresses on thin sections, composite beams; columns energy absorption and resilience, inertial stresses, impact loading, and deflection of beams by energy methods and bolted fastenings, and an introduction of finite element analysis. *Prereq.* MET 1315.

MET 1444 Power Generation

Explores electrical power generation by thermomechanical, electromechanical, nuclear, and hydraulic systems. Analyzes thermodynamic cycles as well as practical deviations from the related ideal processes. Considers accessory and auxiliary equipment use. Studies design, performance, economic factors, and public issues affecting electrical power generation.

4 QH**MET 1481 Materials B**

Focuses on the study of inorganic materials (polymers, glasses, ceramics, cements, composites, wood), and materials having important electrical and magnetic properties. A summary of the most recent applications for the fabrication and uses of both met-

4 QH

als and nonmetals. Structures of metals, imperfections, phase diagrams effect of temperature on structure and properties of metals (annealing, recrystallization, recovery, precipitation, diffusion) strengthening mechanisms, mechanical properties of nonferrous metals. Lab experiments in preparation of samples, selection, polishing, and etching; examination of nonferrous metals, use of the microscope, linear analysis construction of cooling curves, and simple binary-phase diagrams. *Prereq.* MET 1380.

MET 1499 Special Problems in Mechanical Engineering Technology**4 QH**

Theoretical or experimental work under individual faculty supervision. *Prereq.* Permission of department chair.

Nursing

NUR 1102 Introduction to Human Nutrition

4 QH

Explores the fundamental role of nutrition in promoting health. Studies the physiological functions of nutrients, their food sources, and recommended intakes for different age groups. Uses principles from the humanities and sciences in developing nutrition concepts. Introduces the use of different diet-assessment tools to assist individuals in meeting nutrient and energy needs. Encourages students to examine their own food choices and how those choices translate into meeting recommended nutrient and energy needs. Discusses the origins of food habits and the relevance of nutrition counseling and education in nursing practice. *Nursing students only.*

NUR 1106 Introduction to Professional Nursing

2 QH

Focuses on socializing students to the discipline of nursing with an introduction to theory-based practice and the philosophy of caring. Explores the dimensions of the professional role within the context of the student's developing self-awareness of personal and professional goals.

NUR 1107 Nursing Process and Skills

3 QH

Emphasizes the centrality of critical thinking to clinical reasoning. Introduces the nursing process as a problem-solving tool and its application in assessing strategies of communication, gathering data, interpreting evidence, analyzing viewpoints, and forming judgments. Provides scientific principles as the framework for using basic nursing skills in the practice of selected nursing interventions. Includes practicing skills in a clinical laboratory. *Prereq. NUR 1108 and MTH 1101 or taken concurrently.*

NUR 1108 Nursing Health Assessment

3 QH

Emphasizes dimensions of collecting data relevant to health status. Provides an opportunity for learning to use tools and skills of health assessment. Discusses ethnic, cultural, spiritual, social, psychological, developmental, and gender and physical aspects of health assessment. Explores formulating nursing diagnosis and examining the relationship of the nursing care plan to overall resources of the client. Includes practicing skills in a clinical laboratory. *Prereq. NUR 1106 or taken concurrently.*

NUR 1202 Pathophysiological Concepts for Clinical Nursing

4 QH

Reviews human physiology related to oxygenation, nutrition, elimination, protective mechanisms, neurological functions, endocrine functions, and skin integrity. Explores how the human body uses its adaptive powers to maintain equilibrium and how alterations affect normal processes. Examines disease processes and implications for nursing practice. *Prereq. BIO 1154 or equivalent.*

NUR 1206 Promoting Healthy Childbearing and Childrearing

8 QH

Emphasizes the promotion of health from conception to adolescence. Describes potential and actual health-risk factors and explores risk-reduction strategies within the context of the individual, family, and community. Uses the nursing process to provide the framework for students to assess and intervene therapeutically in promoting healthy childbearing and childrearing. Examines the concepts of human development of individual, family, and community within the context of the role of the profes-

sional nurse in promoting healthy childbearing and childrearing. Includes clinical learning experiences in a variety of settings. *Prereq. BIO 1154, COP 1370, ENG 1110, ENG 1111, PSY 1111, NUR 1102, NUR 1107, and NUR 1108.*

NUR 1208 Promoting Healthy Adulthood and Aging

8 QH

Emphasizes the promotion of health in adults and includes common health problems of adults at critical life stages from the young adult to the frail, elderly years. Analyzes potential and actual health-risk factors and the discovery of risk-reduction strategies by applying the nursing process to the care of adults living within families and communities. Enables students to use health education and teaching methods in assessing and intervening therapeutically to meet the primary health care needs of adults. Assesses the role of the nurse in partnership with the family and community in disease prevention. Includes clinical learning experiences in a variety of settings. *Prereq. BIO 1120, NUR 1206, and SOC 1100.*

NUR 1282 Wellness

4 QH

Focuses on experiential exploration of the concept of wellness. Examines behaviors and life-style choices that lead to a high level of physical, emotional, and spiritual well-being. Includes issues of assessment of health risk, behavior change, life-style analysis, and the life cycle and stress management through self-analysis. *Open to any undergraduate student.*

NUR 1304 Independent Study Elective

2 QH

Allows students to pursue a topic more intensely or with a special focus. Enables students to contract with a faculty member whose background, interests, and time allow direction of in-depth study. Requires student and faculty member jointly develop course objectives. *Prereq. Permission of academic adviser.*

NUR 1306 Promoting Health Restoration in Children

10 QH

Focuses on the therapeutic nursing interventions used to restore health to children who are experiencing acute and/or complex health problems. Analyzes complex health issues within the context of the individual, family, and community. Examines altered family patterns of coping within a developmental framework and describes support to meet the unique health needs of the family and child. Addresses the therapeutic role in partnership with the family and resources available within a collaborative and interdisciplinary environment. Discusses ethical and legal dimensions of caring for children and their families. Includes clinical learning experiences in a variety of settings. *Prereq. CHM 1106, NUR 1206, NUR 1208. Prereq. or concurrent NUR 1202, NUR 1307, PCL 1306.*

NUR 1307 Influences on Health and Disease

4 QH

Enables the student to understand the values that underlie health-seeking behavior and providing care. Uses values clarification to appreciate individual rights and responsibilities versus the common good. Examines cultural differences in light of individual and group behavior as well as life span issues and family and group responsibilities. Builds a caring ethic and a sense of professional responsibility on the basis of self-awareness and self-examination.

NUR 1308 Promoting Health Restoration in Adults**10 QH**

Focuses on the therapeutic nursing interventions used to restore health to adults who are experiencing acute and/or complex health problems. Analyzes deviations from health with attention to the implications for the individual, as well as the family, in coping with health problems. Analyzes the client's health care needs and the resources to meet them, in collaboration with the client and health providers. Discusses ethical and legal dimensions of nursing care of adults. Emphasizes discharge planning and teaching. Includes clinical learning experiences in a variety of settings. *Prereq.* CHM 1106, NUR 1206, NUR 1208. *Prereq. or concurrent* ENG 1350, NUR 1202, NUR 1307, PCL 1306.

NUR 1404 The Nurse Entrepreneur**4 QH**

Focuses on the role of the nurse as an entrepreneur. Within the general functions of nursing, uses situations involving patient family teaching that provide the framework for introducing students to the essentials of undertaking this function as a business venture. Includes the formation of a nurse entrepreneur's venture action plan to do patient and family teaching. *Open to middle students in nursing.*

NUR 1406 Promoting Healthy Communities**7 QH**

Focuses on developing, implementing, and evaluating therapeutic interventions for the community as the client. Uses the nursing process, within the community context, informed by epidemiological trends, sociocultural characteristics, political and legislative influences, organizational programs, environmental factors, and consumer inputs. Emphasizes the role of the public-health nurse in multiple arenas of practice. Examines epidemiological principles and public-health policies in relation to identified health problems and conditions in a specific community. Enables students to conduct a comprehensive assessment, in partnership with the community, to develop a program to meet an identified community health need. Includes clinical learning experiences in a variety of settings. *Prereq.* NUR 1306, NUR 1308, and PCL 1307.

NUR 1408 Promoting Mental Health Restoration**7 QH**

Focuses on developing, implementing, and evaluating psychotherapeutic interventions for clients with complex mental health problems. Analyzes alterations in psychobiological and psychosocial functioning and coping. Formulates a plan of care within the context of the client as individual, family, group, and community. Emphasizes the therapeutic use of the self as students develop communication and other helping skills in interpersonal relationships with clients. Provides the opportunity to apply theories, principles, and research findings in providing mental health care for clients in various settings. Fosters collaboration with the client and interdisciplinary team. Discusses the political, legal, and ethical issues related to the delivery of mental-health services and the creative role of the nurse. Includes clinical learning experiences in a variety of settings. *Prereq.* NUR 1306 and NUR 1308.

NUR 1502 Introduction to Research in Nursing**4 QH**

Builds on students' prior exposure to selected studies applied to nursing. Discusses and critiques qualitative and quantitative research and the value of each to the practice of nursing and to the health care field. Examines the importance of research in nursing to both practitioner and consumer. *Prereq.* Concurrent SOC 1320 or equivalent.

NUR 1507 Comprehensive Nursing Practicum**6 QH**

Helps students to synthesize nursing knowledge, skills, and experience and facilitate their transition to professional nursing practice and case management of clients with complex health problems. Enables students to demonstrate leadership and collaborative skills in working with other members of the health care team. Examines professional, role, and career issues in weekly seminars. Includes clinical learning experiences in a variety of settings. *Prereq.* Senior standing. *Prereq. or concurrent* NUR 1406, NUR 1408, and NUR 1508.

NUR 1508 Managing and Leading in Nursing**6 QH**

Focuses on the knowledge and skills related to the delivery of health services within a nursing management context. Presents theories, concepts, and models, such as managed care, organization and management, authority, delegation, resource allocation, budgeting, leadership and empowerment, change, motivation, environmental safety, quality improvement, collective bargaining, and conflict resolution, to give the student an understanding of the knowledge base for the management role of the baccalaureate nurse. Provides the opportunity to apply principles and practice skills in planning and delegating nursing care using different organizational models and approaches. Discusses the developing creative role for managing and leading in nursing. Includes clinical learning experiences in a variety of settings. *Prereq.* Senior standing. *Prereq. or concurrent* NUR 1406 and NUR 1408.

NUR 1606 Women's Health Choices and Decisions**4 QH**

Explores personal health and safety concerns specific to women from menarche to mid-life. Helps empower students to take charge of their health by examining personal experiences, their knowledge base, and developing self-awareness. Investigates self-promotion of health; how to be a knowledgeable consumer; when and how to choose a provider; and care options for fertility regulation, infertility, pregnancy, childbirth, and other conditions specific to women. *Open to any undergraduate student.*

Pharmacy and Health Sciences

Athletic Training

ATP 1000 Introduction to Athletic Training 3 QH
Exposes students to the profession. Introduces basic injury prevention and first aid techniques.

ATP1050 Emergency Care of Athletic Injuries 3 QH
Teaches recognition and management of medical emergency, emphasizing those conditions most commonly suffered by athletes. Upon successful completion of this course, the student will be awarded American Red Cross certification in CPR and First Aid. *Prereq.* ATP 1000 or permission of instructor.

ATP 1100 Prevention and Care of Athletic Injuries 3 QH
Examines the principles in prevention, recognition, management, and rehabilitation of athletic injuries. Focuses on physiological and pathological nature of the injury and discusses the course of action for return to competition. *Prereq.* ATP 1000.

ATP 1101 Athletic Training Laboratory 1 QH
Discusses the biomechanical and anatomical principles as well as indications and contraindications of the various wrapping and strapping techniques used for athletic injuries. Presents the indications for use and types of protective devices such as braces and splints. Utilizes lab time for applying and developing skills.

ATP 1110 Fundamentals of Athletic Training 3 QH
Presents the duties and functions of the certified athletic trainer, emphasizing how to prevent and evaluate athletic injuries. Focuses on the athletic trainer's relationship to other allied medical professions.

ATP 1200 Clinical Athletic Training 4 QH
Introduces the student athletic trainer to the clinical experience. Gives an opportunity to practice the various skills essential for evaluating, treating, and rehabilitating athletic injuries. *Prereq.* ATP 1100 and ATP 1101.

ATP 1300 Advanced Athletic Training 1 4 QH
Focuses on the evaluating and predisposing conditions of heat illness, head and neck trauma, and lower extremity athletic injuries. *Prereq.* ATP 1100 and ATP 1200.

ATP 1350 Advanced Athletic Training 2 4 QH
Continues ATP 1300. Focuses on evaluating athletic injuries of the upper extremity, torso, and lower back. Covers how to identify injury and illness of the internal organs. *Prereq.* ATP 1100 and ATP 1300.

ATP 1360 Applied Neuroscience 5 QH
Covers morphology and functions of the human nervous system. Discusses the normal function and structure of the nervous system and the effects of structural abnormalities on nervous system functions. Includes lecture and laboratory involving handling of human brain tissue. *Prereq.* BIO 1152, BIO 1153, BIO 1154, and ATP 1300 or permission of the instructor.

ATP 1390 Athletic Training Practicum 1 3 QH
Offers assignments in field settings related to students' areas of study. Gives students the opportunity to observe and perform

professional skills under a certified athletic trainer's supervision. *Prereq.* ATP 1100 and ATP 1200.

ATP 1400 Therapeutic Modalities in Athletic Training 4 QH
Presents the physical agents used in athletic training with regard to their physiologic effects. Discusses where in the healing process these agents may be used and their theoretical implications. *Prereq.* ATP 1100 and ATP 1200.

ATP 1490 Athletic Training Practicum 2 3 QH
Same as ATP 1390.

ATP 1500 Therapeutic Reconditioning 4 QH
Covers principles and objectives inherent in rehabilitating athletic injuries. Discusses orthopedic rehabilitation fundamentals, as well as specific conditioning and reconditioning techniques. Exposes the student to the different types of exercise and equipment used in rehabilitation. Provides laboratory experiences in applying rehabilitation programs using equipment. *Prereq.* ATP 1200 and ATP 1300.

ATP 1590 Athletic Training Practicum 3 3 QH
Same as ATP 1390.

ATP 1600 Organization and Administration of Athletic Training Programs 4 QH
Provides students with the knowledge and skills necessary to manage an athletic training facility. Includes topics such as budgeting, facility design, physical examinations, and staffing. *Prereq.* ATP 1100, ATP 1200, and ATP 1300.

ATP 1690 Athletic Training Practicum 4 3 QH
Same as ATP 1390.

ATP 1800 Senior Seminar 4 QH
Discusses current topics pertaining to the fields of athletic training and sports medicine. *Prereq.* Senior standing in the athletic training major.

Cardiopulmonary Sciences

CPS 1111 Cardiopulmonary Sciences Seminar 1 1 QH
Introduces the beginning cardiopulmonary sciences student to the various areas of study within the major. Examines the role of each profession in health care delivery. Field trips give students the opportunity to observe professionals in their specific roles.

CPS 1112 Cardiopulmonary Sciences Seminar 2 1 QH
Continues CPS 1111.

CPS 1113 Cardiopulmonary Sciences Seminar 3 1 QH
Continues CPS 1112.

CPS 1114 Basic Life Support 1 QH
Covers what CPR is, how it works, when CPR should be started, and when it should be stopped. Other topics include basic anatomy and physiology, prudent heart living, signals of heart attack, actions for survival, and medicolegal considerations. Teaches the technical aspects of cardiopulmonary resuscitation and foreign body airway obstruction. Three hours of lectures will

be followed by three three-hour demonstration/practice/evaluation laboratory sessions. Students successfully completing written and manikin evaluations will be issued American Heart Association BLS Healthcare Provider cards. *Enrollment is limited and preference will be given to Cardiopulmonary Science majors.*

CPS 1211 Practicum in Respiratory Care 4 QH

Provides clinical experience in hospitals. Focuses on respiratory care for noncritical patients. Emphasizes infection control, medical gas administration, humidification of medical gases, aerosol therapy, chest physiotherapy, deep breathing treatments, and the administration of aerosol medications. *Prereq. CPS 1320 and CPS 1321. CPS 1301 and CPS 1332 taken concurrently.*

CPS 1301 Professional Practice Laboratory 1 QH

Provides practice in basic care skills through laboratory exercises and simulation of patient-care situations. Lab fee. *Prereq. CPS 1332 concurrently.*

CPS 1302 Professional Practice Laboratory 2 1 QH

Provides students with hands-on experience in working with respiratory therapy equipment. Sets up simulated patient-management problems in the lab to provide problem-solving experience. Lab fee. *Prereq. CPS 1301, CPS 1211 and CPS 1433 concurrently.*

CPS 1314 Practicum in Respiratory Care 2 6 QH

Focuses on treating patients with more complex cardiorespiratory disorders. The second course in a sequence of three directly related to the clinical practice of various modalities of respiratory care. *Prereq. CPS 1302, CPS 1433 or concurrently, and CPS 1403 concurrently.*

CPS 1315 Practicum in Respiratory Care 3 6 QH

Provides clinical experience in hospitals. Emphasizes respiratory care for adult, pediatric, and neonatal critical patients. Reviews advanced respiratory-care topics such as airway care, mechanical ventilation, and positive end expiratory pressure. *Prereq. CPS 1433, CPS 1403, CPS 1434 or concurrently, CPS 1404 or concurrently.*

CPS 1320 Cardiopulmonary Physiology 4 QH

Provides detailed information relating to cardiopulmonary physiology in the normal, diseased, and stressed state. Discusses the mechanics of regulatory control and interaction between the cardiovascular and respiratory systems. *Prereq. PAH 1202 and PAH 1204 or equivalent.*

CPS 1321 Cardiopulmonary Disease 4 QH

Introduces clinical diagnostic procedures employed in evaluating cardiopulmonary patients and description of the etiology, pathophysiology, diagnosis, and treatment of major cardiopulmonary diseases. *Prereq. CPS 1320, PAH 1202 and PAH 1204.*

CPS 1332 Introduction to Respiratory Care 4 QH

Focuses on the theory and application of medical gas administration and humidity/aerosol therapy. Basic to all other professional respiratory therapy courses. *Prereq. CPS 1321 and CPS 1301 concurrently.*

CPS 1403 Professional Practice Laboratory 3 1 QH

Provides students with hands-on experience with respiratory therapy procedures. Sets up simulated patient-management problems in the lab to provide problem-solving experience. Lab fee. *Prereq. CPS 1302 and CPS 1434 concurrently.*

CPS 1404 Professional Practice Laboratory 4 1 QH

Provides students with an opportunity to acquire experience in working with respiratory therapy life support equipment. Sets up simulated critical-care problems in the lab to provide problem-solving experience. Lab fee. *Prereq. CPS 1403 and CPS 1576 concurrently.*

CPS 1408 Research Design 4 QH

Introduces research methodology and scientific writing. Reviews the literature on topics related to the cardiopulmonary sciences. Emphasizes analyzing data and critiquing written research. *Prereq. Statistics.*

CPS 1414 Clinical Seminar 1 1 QH

Discusses clinical topics and respiratory-care problems encountered during clinical practice in the hospitals. *Prereq. CPS 1314 concurrently.*

CPS 1415 Clinical Seminar 2 1 QH

Discusses clinical topics and critical-care problems encountered during clinical practice in the hospital. *Prereq. CPS 1315 concurrently.*

CPS 1433 Respiratory Care for the Medical and Surgical Patient 4 QH

Continues the introduction to respiratory therapy, as the didactic portion of beginning clinical experience on noncritical patients. Focuses on respiratory-care problems following major surgery and those problems related to medical patients. *Prereq. CPS 1211, CPS 1302, and CPS 1332 concurrently.*

CPS 1434 Respiratory Care for the Critical Patient 4 QH

Focuses on respiratory-care problems encountered with patients in intensive care units. The last in a sequence of three directly related to the theory of respiratory therapy procedures; designed as the didactic portion of clinical experience on critical patients. *Prereq. CPS 1433 concurrently.*

CPS 1516 Advanced Clinical Seminar 1 1 QH

Complements CPS 1571. Discusses current clinical problems related to life-support systems problems encountered in the hospital. *Prereq. CPS 1641 concurrently.*

CPS 1517 Advanced Clinical Seminar 2 1 QH

Complements a professional elective taken concurrently. Discusses current clinical problems and research related to problems encountered in the hospital. *Prereq. CPS 1642 concurrently and CVT status.*

CPS 1518 Advanced Clinical Seminar 3 1 QH

Complements CPS 1511. Discusses current clinical problems and emphasizes research related to critical-care problems. *Prereq. CVT senior status.*

CPS 1570 Fundamentals of Perfusion Technology 4 QH

Applies biologic, pharmacologic, and physical principles to extracorporeal cardiopulmonary support. Focuses on the basic theory and instrumentation of perfusion technology, emphasizing circuit design and function, oxygenator theory, pump dynamics, blood recovery and autotransfusion procedures, myocardial protection techniques, intraaortic counterpulsation, aseptic techniques, and surgical procedures. Provides an opportunity to work with perfusion equipment and to develop the psychomotor skills necessary to implement perfusion procedures. Lab. *Prereq. Perfusion Technology students only.*

- CPS 1571 Advanced Life Support Systems I** 4 QH
Introduces students to selected techniques of advanced life support applied to the critically ill patient. *Prereq. Senior status in CPS.*
- CPS 1572 Perfusion Technology** 4 QH
Introduces students specializing in perfusion technology to the theory, principles, and concepts of cardiovascular perfusion. *Prereq. CPS 1571.*
- CPS 1576 Neonatal and Pediatric Respiratory Care** 4 QH
Provides students with an understanding of the methods and techniques of respiratory therapy for neonatal and pediatric patients. Emphasizes mechanical ventilation, newborn care, and the respiratory distress syndrome. *Prereq. RT senior status.*
- CPS 1578 Advanced Medical Monitoring** 4 QH
Provides students with an opportunity for an in-depth exposure to the theory and application of physiologic monitoring systems and their use in critical-care settings. *Prereq. Perfusion Technology students only.*
- CPS 1611 Kinesiology** 4 QH
Investigates the science of human motion and anatomic and mechanical principles as they relate to an understanding of skillful, efficient, and purposeful human motion. Examines the internal and external forces acting on a human body and their effects. *Prereq. PAH 1202 and PAH 1204 or equivalent.*
- CPS 1612 Exercise Physiology I** 4 QH
Studies the immediate and long-range effects of exercise on the human body, emphasizing the cardiovascular and respiratory systems, muscles, and metabolism. Includes physical fitness, body composition, and selected components of motor performance. Covers assessment techniques and training principles. Introduces indirect open-circuit calorimetry and EKG monitoring. Does not include a lab. *Prereq. PAH 1202 and PAH 1204.*
- CPS 1614 Electrocardiography** 4 QH
Studies basic and intermediate electrocardiography, including cardiac function, lead systems, rate, rhythm, axis, infarction, ischemia, hypertrophy, effects of cardiovascular drugs, and effects of exercise. *Prereq. PAH 1202 and PAH 1204 or equivalent.*
- CPS 1615 Exercise Physiology I** 5 QH
Studies the immediate and long-range effects of exercise on the human body, emphasizing the cardiovascular and respiratory systems, muscles, and metabolism. Includes physical fitness, body composition, and selected components of motor performance. Covers assessment techniques and training principles. Introduces indirect open-circuit calorimetry and EKG monitoring. Includes a laboratory. *Prereq. PAH 1202 and PAH 1204.*
- CPS 1618 Cardiopulmonary Assessment** 5 QH
Provides students with the opportunity to gain knowledge and understanding of physiological principles and concepts related to clinical cardiopulmonary assessment. Integrates lecture topics with practical laboratory experiences in physical examination techniques, basic pulmonary function assessment, laboratory studies, and graded exercise testing with 12-lead electrocardiography. *Prereq. Anatomy and Physiology 1 and 2, Cardiopulmonary Physiology, Cardiopulmonary Disease.*
- CPS 1619 Exercise Prescription and Programming in Cardiovascular Health** 4 QH
Focuses on skills needed to develop individualized exercise prescriptions for apparently healthy, cardiac, and pulmonary patients. Concentrates on the design, implementation and evaluation of fitness and wellness programs for individuals and groups in a corporate, commercial, or clinical setting. *Prereq. CPS 1320 and CPS 1612 concurrently (combines former course material in CPS 1613 and CPS 1617).*
- CPS 1632 Health Science Education** 4 QH
Studies the systems approach to teaching health science. Covers developing instructional goals based on needs assessments, behavioral learning objectives, instructional strategies, and evaluation instruments. Emphasizes using criterion-referenced measurement strategies to evaluate mastery of clinical skills. *Prereq. CPS junior status.*
- CPS 1641 Fundamentals of Cardiac Catheterization** 4 QH
Covers cardiovascular technology and basic concepts such as medical aseptic technique. Introduces concepts related to cardiac output studies, shunt determinations, and electrophysiology. Examines the fundamental principles of intracardiac waveforms and cardiac catheterization. *Prereq. CPS 1320 and CPS 1321.*
- CPS 1642 Advanced Cardiac Catheterization** 4 QH
Covers advanced cardiac catheterization interventional techniques such as coronary angioplasty, stents, and atherectomy. Introduces new technologies such as coronary rotator and lasers. Includes other techniques such as the intra-aortic balloon pump, cardiac pacemakers, and cardiac studies using biopsy, pericardiocentesis, and electrophysiology. *Prereq. Senior year status, CPS 1516, CPS 1641, and CPS 1644 concurrently.*
- CPS 1644 Cardiovascular Technology Internship** 6 QH
Provides cardiovascular technology students with the opportunity to develop, practice, and master skills required to assist with diagnostic and interventional procedures in the cardiac catheterization laboratory. *Prereq. CPS 1642 concurrently.*
- CPS 1801 Directed Independent Study I** 2 QH
Offers directed study in a student's major wherein in-depth investigation of a special interest area is undertaken. *Formerly RTH 1801.*
- CPS 1802 Directed Independent Study 2** 2 QH
Offers directed study in a student's major wherein in-depth investigation of a special interest area is undertaken. *Formerly RTH 1802.*
- CPS 1810 Continuation of Clinical** 0 QH
Provides perfusion technology students with the opportunity to clear grades of I (Incomplete) in CPS 1515, Practicum in Perfusion Technology 2. At the end of the six-week period, students will be reevaluated using the criteria developed for CPS 1515, and I grades will be changed to the grades earned at that time. *Formerly RTH 1810.*
- CPS 1820 Internship in Cardiovascular Health and Exercise** 12 QH
Provides commercial, corporate, or clinical experience in exercise testing, exercise prescription and leadership, and client education and counseling in a supervised setting. Students must successfully complete 360 hours of internship experience in addition

to other written assignments. *Prereq.* Completion of quarter 9 in the cardiovascular health and exercise curriculum. Formerly HSL 1800/1801.

CPS 1821 Minor Internship in Cardiovascular Health and Exercise 6 QH

Provides commercial, corporate, or clinical experience in exercise testing, exercise prescription and leadership, and client education and counseling in a supervised setting for students minor-ing in cardiovascular health and exercise. Students must success-fully complete 200 hours of internship experience in addition to other written assignments. *Prereq.* HSL 1612, HSL 1613, and HSL 1614. Formerly HSL 1801.

CPS 1866 Special Problems 4 QH

Discusses current issues and concepts in cardiovascular health and exercise. Requires an independent research paper. *Prereq.* Junior and senior cardiovascular health and exercise majors. Formerly HSL 1866.

Counseling Psychology, Rehabilitation, and Special Education

CRS 1200 Introduction to Special Education 4 QH

Surveys the characteristics and the social, emotional, and educa-tional adjustment of individuals with special needs. Reviews legis-lation and current trends, with an emphasis on integration and full inclusion of individuals with special needs in regular educa-tion settings and also in the community. Introduces principles of instruction and the development of strategies for the generation of Individualized Education Programs (IEPs).

CRS 1314 Introduction to Counseling 4 QH

Surveys major theoretical approaches to counseling. Provides training and practice in listening skills to aid in the development of facilitative responses. Combines didactic presentations and experiential activities to assist students in understanding and implementing a variety of counseling approaches.

CRS 1315 Introduction to Etiology and Development of Special Needs 4 QH

Presents an overview of the etiology and development of dis-abling conditions, current issues in these areas, problems associ-ated with drug and substance abuse and other high risk factors, and curriculum strategies for dealing with early childhood, ele-mentary, and middle school children with varying special needs.

CRS 1316 Introduction to Assessment, Program Planning, and Implementation in Special Education 4 QH

Presents the process of assessment, program planning, and imple-mentation for individuals with special needs. Requires students to administer three education assessments, summarize the results in a case report, propose a program of education intervention, and identify methods to facilitate and monitor its implementation.

CRS 1317 Student Teaching and Seminar in Special Education 8 QH

Allows for full-time participation in a University-arranged and supervised school program, emphasizing inclusive settings. Gives the student the opportunity to analyze the teaching of and the learning by students with special needs and to demonstrate, evalu-ate, and develop teaching skills. *Prereq.* Advanced professional sequence with minimum 2.5 QPA both overall and in teaching major.

CRS 1500 Mental Health 4 QH

Investigates emotional health and well-being as they relate to total health, with emphasis on factors that influence emotional behavior. Includes various approaches to emotional health in school programs and the community.

CRS 1502 Communicable and Degenerative Diseases 4 QH

Focuses on the disease immunity process, with emphasis on prevalent communicable diseases in the United States today and their transmission. Also studies chronic diseases, cardiovascular diseases, cancer, diabetes, and other constitutional and degenera-tive diseases and disorders that affect the nation's health.

CRS 1503 Human Sexuality and Family Dynamics 4 QH

Examines sexuality from a physical, psychological, social, histori-cal, and cultural perspective. Considers sexual needs and con-cerns about sexuality at various stages in life, including a variety of approaches to sex education in schools, community, and the family. *Prereq.* Middler standing or above.

CRS 1510 Health Counseling 4 QH

Identifies physical, mental, emotional, and social health problems, remedial procedures, and counseling techniques to aid health educators in dealing more effectively with various health issues. *Prereq.* Junior standing or above.

CRS 1800 Directed Study 4 QH

This experience is provided for the student whose unique acade-mic needs or interests cannot be adequately satisfied in any of the scheduled courses of the department. Directed study requires approval of the supervising faculty member and of the dean's office of the college. Approval forms must be submitted to the dean's office during the quarter prior to registration for the directed study. *Prereq.* Permission of instructor.

Dental Hygiene

DHY courses are open only to Forsyth Dental Hygiene students unless otherwise indicated.

DHY 1100 Oral Anatomy and Histology 3 QH

Introduces the student to the structures of the oral cavity. Includes the embryology and histology of the head and neck structures with primary emphasis on the oral cavity. Studies the formation, erup-tion patterns, and morphology of the primary and permanent denti-tions. *This course is open to non-dental hygiene majors.*

DHY 1101 Dental Hygiene Orientation 1 2 QH

Presents an overview of issues relating to the profession of dental hygiene including historical development with emphasis on the philosophy, responsibilities, and current roles of the dental hygienist as a member of the dental health team. Reviews dental terminology. Covers dental manpower and dental delivery systems.

DHY 1102 Dental Hygiene Orientation 2 2 QH

Continues DHY 1101. Presents an overview of the dental hygiene process of care to include assessment, diagnosis, planning, imple-mentation, and evaluation. Covers infection control, medical/ dental terminology, and principles of four-handed dentistry. Includes a laboratory component.

DHY 1104 Dental Procedures 1**3 QH**

Introduces the student to the discipline of dentistry. Reviews dental specialties with attention given to the roles and responsibilities of the dental assistant. Places emphasis on exposure control, four-handed dentistry, and use and manipulation of some dental materials. A laboratory component is included. *This course is open to non-dental hygiene majors.*

DHY 1105 Dental Procedures 2**4 QH**

Continues DHY 1104. Includes a clinical internship in the Harvard School for Dental Medicine postdoctoral training clinics. Students will have an opportunity to apply skills learned in DHY 1104. *Prereq. DHY 1104. This course is open to non-dental hygiene majors.*

DHY 1204 Head and Neck Anatomy**2 QH**

Provides a clinical study of anatomy of the head and neck. Emphasizes deviations from normal anatomy and the diagnosis and management of these deviations as they relate to the patient.

DHY 1209 Periodontology**3 QH**

Builds upon oral anatomy and pre-clinical dental hygiene concepts presented in the fall quarter. Discusses the histopathology, etiology, and clinical features of periodontal infections. Includes current concepts in risk assessment and diagnostics. Emphasizes diagnosis, treatment planning, and clinical management of periodontal patients. Includes a one-hour seminar. *Formerly DHY 1208.*

DHY 1211 Dental Hygiene Theory 1**2 QH**

Encompasses the fundamentals of the science of dental hygiene. Introduces the basic principles and skills utilized to provide oral health care for the patient.

DHY 1212 Dental Hygiene Theory 2**2 QH**

Provides the student with information necessary for the dental management and treatment of the medically compromised patient. Discusses the etiology, clinical and oral manifestations, treatment planning, and management considerations for the major medical conditions of concern in dentistry. In addition to assigned readings and lecture information, students will participate in case method projects to facilitate the clinical application of the course material.

DHY 1214 Dental Hygiene Theory 3**2 QH**

Discusses the dental hygiene management of patients with special developmental/acquired, medical/physical, sensory and/or psychological needs. Includes topic areas of gerodontology disabling/handicapping conditions, major psychiatric diseases, dependency disorders, and the cancer patient. Emphasizes the barriers and access to care, patient management via normalization of care, the use of adaptive aids, preventive techniques, and individualized treatment planning. *Formerly DHY 1314.*

DHY 1220 Radiology 1**2 QH**

Uses lectures, slides, and laboratory experiences to provide the student with a basic knowledge and understanding of radiation biology and hygiene; radiographic image receptors and the developing process; and the fundamentals of dental radiography including the production and projection of X-rays. Emphasizes radiographic surveys by means of the paralleling, bisecting angle, and extra-oral techniques.

DHY 1221 Radiology 2**1 QH**

Continues DHY 1220. Students refine their skills in producing diagnostically acceptable radiographs. Emphasizes interpreting films for projection, exposure, processing errors, normal radiographic anatomy, and common diseases/anomalies of the teeth and bone.

DHY 1228 Dental Materials**3 QH**

Studies the basic composition and properties of dental materials utilized in dental hygiene practice. Emphasizes the selection, manipulation, and clinical management of dental materials. Examines the relationship between the oral environment and dental materials. Laboratory sessions are integrated with lectures to provide the student with the opportunity to practice various techniques such as mixing cements, pit and fissure sealants, polishing of amalgam and composite restorations, impression taking, and study models.

DHY 1240 Nutrition**2 QH**

Introduces the science of human nutrition based upon the principles of biochemistry. Reviews the nature and function of the micro- and macronutrients essential for health with specific emphasis on the role diet and nutrition play in the prevention of diseases and the promotion of optimum health and oral wellness.

DHY 1301 Introduction to Oral Health Research**3 QH**

Introduces the currently accepted theories and methods of oral health research. Studies research methods, experimental design, and statistical methods with emphasis on dental epidemiology and clinical research. Reviews current dental research from dental journals to evaluate the methods, design, validity, and relevancy of the research on the professions of dentistry and dental hygiene. Discusses future research and advances in technology to help the student gain a perspective on needed research. Funding sources will also be reviewed.

DHY 1308 Pathology**4 QH**

Emphasizes oral pathology. Covers normal structures of the oral cavity, principles of general pathology, including inflammation, neoplasia and diseases/conditions of the oral cavity and its environs, with clinical features, some histopathology, the course of the disease(s), and treatment. Stresses common developmental disorders, cysts of the jaws and neck, caries, pulpitis, other dental defects, mucous membrane pathology, viral, bacterial and fungal diseases, white lesions, benign and malignant oral diseases, pigmented dental and mucosal lesions, allergies, and oral manifestations of systemic diseases. *Formerly DHY 1206 and DHY 1307, Pathology 1 and 2.*

DHY 1315 Dental Hygiene Theory 5**2 QH**

Introduces dental specialties through lectures, slides, and case presentations of dental procedures related to individual specialties. Topics presented by guest lecturers include orthodontics, endodontics, oral and maxillofacial surgery, prosthodontics, temporomandibular disorders (TMD), dental implants, maxillofacial prosthetics, pediatric dentistry, and radiovisiography.

DHY 1316 Dental Hygiene Theory 6**2 QH**

Presents material to assist the dental hygiene student to develop the management skills needed to become an effective and productive member of the dental team. Emphasizes identifying professional goals, developing communication skills, writing resumes, perfecting interviewing techniques, and recognizing employer/employee responsibilities and expectations.

DHY 1317 Dental Hygiene Theory 4**2 QH**

Presents material that focuses on the preventive services of dental hygiene care. Students will consider the role of the dental hygienist relative to caries control, fluoride recommendations, and dietary counseling. Students will integrate concepts of oral wellness and smoking cessation into client care plans as well as examine the delivery of preventive services to clients. Students will also examine chair-side ergonomics for prevention of occupational injuries to themselves.

DHY 1330 Pharmacology**3 QH**

Places initial emphasis on nomenclature to familiarize the student with the terminology used in pharmacology. Undertakes the study of drugs to acquaint the student with their origin, physical and chemical properties, preparation, modes of administration, and effects upon the body systems. Gives special consideration to those drugs which are of dental value, including antiseptics, antibiotics, pain relieving drugs, and the anesthetics.

DHY 1331 Pain Control**2 QH**

Introduces the dental hygiene student to the recognition and management of pain, fear, and anxiety associated with dental treatment. Lectures will cover basic and current concepts in pain and anxiety control in dental treatment. *Prereq.* Current certification in cardiopulmonary resuscitation and DHY 1330.

DHY 1361 Public Health**2 QH**

Introduces current principles and issues in public health and their relationship to the delivery of oral health care to the public. Investigates and discusses the principles of epidemiology, health care delivery, biostatistics, allied health utilization, and fluoridation. Provides each student with the opportunity to select one issue in public health and explore it by writing a short position paper.

DHY 1362 Community Health**2 QH**

Examines the topics related to community oral health. Explores the principles of program planning and basic health education methods and materials. Provides each student with the opportunity to select a population of interest in the community and plan, implement, and evaluate a preventive oral health program according to the needs of that population. This experience may help students to recognize a commitment to the community and to accept the responsibilities of a health care professional.

DHY 1364 Seminar in Legal Issues and Ethics**2 QH**

Provides a profile of the dental hygienist within a legal and ethical framework. Examines state practice acts. Students will explore the responsibilities involved in hygienist/patient and employee/employer relationships. Investigates the legal ramifications of a variety of practice settings. Uses case studies and values clarification models to encourage ethical and professional development.

DHY 1401 Oral Health Gerontology**4 QH**

Introduces the dental hygiene student to oral health gerontology. Reviews the biological, psychological, and social aspects of aging. Places an emphasis on oral tissues. Discusses in detail dental hygiene treatment planning and evaluation for both institutionalized and community based elderly patients. Examines public policy and financing of oral health care for the aged. *Prereq.* Extra mural experience required.

DHY 1402 Advanced Public Health**4 QH**

Studies the current issues surrounding today's public health care delivery system in depth. Places emphasis on health legislation both at the state and federal levels. Issues include access to health care, quality assurance/control, and health care costs and financing. Includes evaluation of possible solutions in terms of appropriateness, effectiveness, and economy and a review of health care delivery systems. Students will utilize the principles of oral epidemiology through surveys of specified area populations to develop a health promotion plan.

DHY 1403 Dental Seminars**4 QH**

Reviews the current concepts in dentistry and dental hygiene theory and practice. Discusses the impact of new knowledge on the art and science of dentistry, dental hygiene, and prevention of dental disease. Topics will be determined by current literature and the political and socio-economic climate of the times. Uses integration and sharing of personal experiences and practices relating to dental hygiene to assess and improve student's communication, leadership, decision making, and organizational skills.

DHY 1410 Independent Study**4 QH**

Gives students an opportunity to explore in depth a subject relevant to their interests. Provides the opportunity to study a problem, present a proposal, carry out a study or a course of action, and prepare both written and oral presentations of their activities.

DHY 1550 Internship**6 QH**

Provides professional field assignment in a setting designed to enhance students in their professional career development. Includes supervision by faculty, conferences with professional staff, and projects. Internship may be spread over more than one academic quarter. A minimum of 180 hours is required.

DHY 1611, DHY 1612 Clinical Dental Hygiene 1 and 2**3 QH each**

Provides pre-clinical and laboratory instruction in the techniques utilized for the complete evaluation and prophylaxis of patients including instrumentation, polishing, patient evaluation procedures, oral physiotherapy, prevention of disease transmission, medical emergencies, and treatment planning. Pre-clinical activities are coordinated with DHY 1211 and DHY 1212. Actual delivery of patient care begins in DHY 1612. Students will be responsible for patient recruitment. A weekly seminar in DHY 1612 will be conducted for discussion of medically compromised patient cases and patient management strategies.

DHY 1613 Clinical Dental Hygiene 3**3 QH**

Provides dental hygiene and other procedures for both adult and child patients in the Forsyth Clinic. Students will be responsible for patient recruitment. A weekly seminar is included for the discussion of patient cases.

DHY 1614, DHY 1615, DHY 1616 Clinical Dental Hygiene 4, 5, and 6**6 QH each**

Provides clinical experience to the dental hygiene student. Students provide preventive, educational, and therapeutic oral health services as delegated by the Commonwealth of Massachusetts at our dental hygiene clinic to children and adults on an appointment basis. Students will be responsible for patient recruitment. In addition to the clinical training at the Forsyth Dental Center dental hygiene clinic, students supplement this training via extramural rotations at area hospitals, community health care centers, and public health care programs. A weekly one-hour seminar relates dental hygiene theory to clinical practice.

Health, Sport, and Leisure Studies

HSL 1100 Beginning Swimming	1 QH	HSL 1134 Aerobic Exercise and Dance	1 QH
Focuses on basic swimming skills for non-swimmers, with emphasis on personal water safety.		Focuses on aerobic fitness, with strong emphasis on concepts of exercise safety and conditioning.	
HSL 1101 Intermediate Swimming	1 QH	HSL 1138 Beginning Skiing	1 QH
Focuses on basic and advanced swimming skills, with emphasis on form and efficiency. <i>Prereq.</i> HSL 1100 or equivalent.		Focuses on fundamental techniques of downhill skiing. Lab fee.	
HSL 1106 Beginning Scuba	2 QH	HSL 1139 Intermediate Skiing	1 QH
Focuses on basic skin-diving and scuba-diving skills, with emphasis on safety. <i>Prereq.</i> HSL 1101 or equivalent.		Focuses on downhill skiing, including intermediate and advanced techniques. Emphasizes skill development. Lab fee. <i>Prereq.</i> HSL 1138.	
HSL 1107 Sailing	1 QH	HSL 1140 Basketball	1 QH
Focuses on basic skills in sailing.		Focuses on knowledge and skills appropriate for playing basketball at the beginning level.	
HSL 1109 Beginning Gymnastics 1	1 QH	HSL 1142 Volleyball	1 QH
Introduces, in a coeducational approach, basic skills in floor exercise, vaulting, balance beam, parallel bars, uneven bars, high bar, and rings.		Focuses on knowledge and skills appropriate for playing volleyball at the beginning level.	
HSL 1114 Badminton	1 QH	HSL 1150 Soccer	1 QH
Focuses on basic badminton strokes, concepts, rules, strategies, and game play.		Focuses on knowledge and skill appropriate to play soccer at the beginning level.	
HSL 1116 Tennis	1 QH	HSL 1153 Modern Dance 1	1 QH
Focuses on basic tennis strokes, concepts, rules, strategies, and game play.		Introduces modern dance technique and style.	
HSL 1121 Beginning Self-Defense	1 QH	HSL 1154 Modern Dance 2	1 QH
Surveys the principles and fundamental skills at the beginning and intermediate levels.		Continues HSL 1153, with progression to more complex modern dance techniques and combinations. <i>Prereq.</i> HSL 1153 or equivalent.	
HSL 1124 Beginning Fencing	1 QH	HSL 1155 Modern Dance 3	1 QH
Focuses on the fundamental principles and techniques of fencing at the beginner level.		Continues HSL 1154, with progression into the expressive and choreographic use of modern dance techniques. <i>Prereq.</i> HSL 1154 or equivalent.	
HSL 1126 Karate 1	1 QH	HSL 1156 Ballet 1	1 QH
Focuses on fundamental techniques of unarmed combat for self-defense using the punches, kicks, and blocks of Tae Kwan Do/ Karate.		Introduces ballet fundamentals, with emphasis on alignment.	
HSL 1127 Karate 2	1 QH	HSL 1157 Ballet 2	1 QH
Continues HSL 1126, with progression to more complex techniques and combinations of punches, kicks, and blocks related to Tae Kwan Do/Karate. <i>Prereq.</i> HSL 1126.		Continues HSL 1156, with emphasis on developing lyrical style. <i>Prereq.</i> HSL 1156 or equivalent.	
HSL 1131 Yoga	1 QH	HSL 1159 Jazz Dance 1	1 QH
Introduces yoga skills and techniques for men and women at the beginning level.		Introduces the fundamentals of jazz dance, with emphasis on alignment.	
HSL 1132 Weight Training	1 QH	HSL 1160 Jazz Dance 2	1 QH
Introduces the principles and use of resistive exercises: isotonic exercise (weights), isometric exercise, and the appropriateness of each.		Continues techniques introduced in HSL 1159, with emphasis on developing jazz dance style. <i>Prereq.</i> HSL 1159 or equivalent.	
HSL 1133 Physical Conditioning	1 QH	HSL 1163 Ballroom Dance	1 QH
Focuses on assessing one's personal physical fitness level, with emphasis on establishing a personal exercise regimen based on scientific principles of training. Utilizes special sections for different mediums of exercise, such as aerobic dance techniques, running, and circuit training.		Introduces traditional and contemporary partner dancing.	
		HSL 1164 Ballroom Dance 2	1 QH
		Continues HSL 1163 with progression into more complex dance steps, partnering techniques, and amalgamations. Expands upon dances taught in HSL 1163 and introduces additional ballroom dances. <i>Prereq.</i> HSL 1163.	
		HSL 1167 Beginning Racquetball	1 QH
		Focuses on knowledge and skills appropriate to play racquetball at the beginning level.	

HSL 1173 Beginning Track and Field**1 QH**

Focuses on the fundamental skills in the various track and field events.

HSL 1180 Health and Physical Education in the Elementary School**4 QH**

Focuses on introductory knowledge and skills necessary for teaching health and physical education to elementary school children. Emphasizes the importance of the elementary school years for health promotion and positive health behaviors, motor skill development, the implications of health-related fitness, and activities that maximize participation for children in vigorous activity promoting wellness. *Replaces HSL 1151.*

HSL 1254 First Aid**2 QH**

Focuses on emergency care procedures recommended for home, school, and community, including cardiopulmonary resuscitation (CPR). Emphasizes practices endorsed by the American Red Cross.

HSL 1259 Secondary School Activities**3 QH**

Studies physical activity appropriate for secondary school students' level of development and interest. Gives students the opportunity to learn about pupils' performance and appropriate teaching techniques through observation and actual experience in off-campus schools and learning centers. Partially satisfies the prepracticum requirements for teacher certification at the grades 5–12 level.

HSL 1261 Anatomy and Physiology 1**4 QH**

Focuses on gross anatomy and physiology of the human skeletal, joint, nervous, and muscular systems.

HSL 1263 Motor Development and Learning**4 QH**

Studies the development of motor skills from early childhood through adolescence. Considers age expectations for perceptual motor behavior. Focuses on how information processing is involved in motor learning and performance. Applies basic research data to learning and executing skill in a variety of sport settings.

HSL 1266 Physical Conditioning Programming**2 QH**

Focuses on how to design and deliver instruction related to physical conditioning and exercises. *Prereq. HSL 1132 and HSL 1133.*

HSL 1270 Health and Motor Development in Early Childhood**4 QH**

Focuses on social, cognitive, and physical aspects influencing health and motor development in preschoolers and across the life span. Emphasizes the importance of the early childhood years for health promotion and positive health behaviors. Studies the development of fundamental motor patterns (walking, running, catching, throwing, striking, climbing, etc.) including perceptual-motor implications. Provides an opportunity to work directly with a preschooler in a laboratory setting observing and assessing fundamental motor patterns and health behaviors. *Replaces HSL 1265.*

HSL 1281 Current Issues in Health**4 QH**

Explores topics of current interest, which may include emotional health, nutrition, fitness, sexuality, drug use, disease, consumer issues, and environmental issues. Emphasizes the needs of the participants.

HSL 1285 Health Concerns of Youth**4 QH**

Applies health concepts to assist youth in reaching a higher level of wellness through preventive measures. Identifies and deals with significant health concerns as they relate to health professionals, teachers, and adults. Partially satisfies the prepracticum requirements for teacher certification grade levels 5–12.

HSL 1286 Nutrition**4 QH**

Offers the student the opportunity to learn and evaluate nutrition information both as a consumer and a future educator. Explains the chemical, biological, and physiological bases of nutrition.

HSL 1325, HSL 1326, HSL 1327**1 QH each****Dance Rehearsal and Performance 1, 2, 3**

Gives students the opportunity to develop skill in performance. Also allows students to choreograph, stage, and perform an original work or perform in the original work of a guest or faculty choreographer. *Prereq. Permission of instructor.*

HSL 1400 Organizational Behavior**3 QH**

Studies human behavior in groups through lectures, reading, and projects. Concentrates on management skills and employment legislation.

HSL 1401 Program Planning in Recreation**4 QH**

Examines in-depth the steps in planning recreation programs in concert with practical experience.

HSL 1403 Concepts of Leisure: Sociopsychological Perspectives**4 QH**

Explores the various sociopsychological perspectives of leisure and the relations of mores, social structure, roles, values, and personality to leisure expression. Investigates other pertinent social and environmental factors that contribute to the phenomenon of leisure.

HSL 1406 Internship Seminar**1 QH**

Offers preparation for professional field assignment in a leisure-service setting. Focuses on identification and assessment of student career goals, analysis of previous volunteer and/or employment experience, professional involvement, and facilitation of the internship placement process.

HSL 1408 Research Methods**4 QH**

Studies basic statistics, the use of experimental and quasi-experimental design, sampling, instrumentation, data collection, and analysis as applied in recreation and leisure studies.

HSL 1409 Research Applications**4 QH**

Examines the use of research methods in selected professional applications ranging from the ongoing research of faculty to student-originated studies.

HSL 1410 Senior Seminar in Contemporary Issues and Trends in Recreation and Leisure**4 QH**

Examines and discusses contemporary issues and trends in the field of recreation and leisure. Focuses on critical aspects of leisure services: legislation, consumer advocacy, professional development, research, and innovations for the improvement of service delivery.

- HSL 1421 Management of Recreation and Physical Education Programs** 4 QH
Focuses on management procedures of recreation and physical education facilities operations. Emphasizes area and facility design, personnel policies, and problem solving related to administration and management.
- HSL 1422 Program Evaluation in Recreation** 4 QH
Examines comprehensive systems for evaluating program effectiveness as it relates to the consumer of recreation services. Emphasizes developing an evaluation system for an agency of the student's choice. Draws case studies from the public, non-profit, and commercial sectors.
- HSL 1423 Commercial Recreation Marketing** 4 QH
Examines commercial and private sector recreation services. Relates case studies, workshops, and practical problems to managing leisure opportunities for resorts, country clubs, theme parks, tourism, sports clubs, manufacturing and merchandising, and industrial recreation.
- HSL 1426 Budget Analysis** 4 QH
Focuses on the study and use of analytical techniques that can improve budgeting decisions. Considers cost-effectiveness and benefit-cost analysis, efficiency measures, and pricing for solutions to capital and operating-budget problems in the non-profit and commercial recreation sectors.
- HSL 1427 Survey of Recreation Facilities** 3 QH
Studies fundamental management, administration, and construction concepts for a wide variety of facilities such as parks, centers, arenas, camps, and marinas.
- HSL 1463 Overview of Physical Disabilities** 4 QH
Offers a holistic and humanistic approach to people with physical disabilities, including amputations, traumatic conditions, sensory impairments, and neurological, orthopedic, and cardiovascular disorders. Studies rehabilitation procedures and treatment, adjunctive therapies, prosthetics, orthotics, assistive devices, and personal care techniques.
- HSL 1511 Independent Study 1** 1 QH
- HSL 1512 Independent Study 2** 2 QH
- HSL 1513 Independent Study 3** 3 QH
- HSL 1514 Independent Study 4** 4 QH
Provides the student with an opportunity for concentrated planning and research in a topic area of health, sport, or leisure. Requires student to submit outline of proposed study.
- HSL 1516 Drug Use and Abuse** 4 QH
Explores the use and abuse of drugs in our society, including prescription and OTC drugs, alcohol, and tobacco. Examines physiological, psychological, and sociological effects of drugs on humans.
- HSL 1599 Theory of Coaching** 4 QH
Provides students with the opportunity to study and analyze learning principles, leadership skills, sociology, and psychology as applied to coaching teams and individuals. Focuses primarily on athletes of junior and senior high school age.
- HSL 1600 Psychology of Sport** 2 QH
Analyzes the psychological behavioral patterns and deviations of sports participants, including spectators and coaches. Emphasizes emotions, motivation, competition, and learning factors. Discusses current sports highlights. *Prereq. Physical education major or permission of instructor.*
- HSL 1601 Sociology of Sport** 2 QH
Studies sport as a social institution, including theories explaining its role in society. Considers social stratification, politics, economics, violence, women, race, mass media, and competition.
- HSL 1610 Anatomy and Physiology 2** 4 QH
Examines gross anatomy and physiology of the human cardiovascular, respiratory, digestive, urinary, and endocrine systems. Also covers metabolism, calorimetry, and other applied topics. *Prereq. HSL 1261.*
- HSL 1615 Critical Teaching Skills** 4 QH
Analyzes direct and indirect, verbal and nonverbal teaching methods for classroom and activity teaching, using techniques such as microteaching, peer teaching, and simulation. Examines techniques for measuring teacher behavior, such as interaction analysis. Requires a lab experience in an education setting. Partially satisfies prepracticum requirements for teacher certification. *Prereq. HSL 1258 or HSL 1259; prepracticum experience.*
- HSL 1777 Honors Adjunct** 1 QH
To be added to any four-credit course in the department when approved by the Honors Committee of Boston-Bouvé. Once approved, the adjunct information is forwarded to the honors office for dissemination to the honors membership. Allows enrollment an unlimited number of times as an adjunct to any health, sport, and leisure studies course at different times during a given academic year.
- HSL 1800 Supervised Field Experience 1** 6 QH
Includes supervision, evaluation conferences, and seminars as an integral part of this experience. When combined with another approved field-based course (HSL 1801 or HSL 1803), offers assignment in a field setting related to the student's area of study within the curriculum, including observing and performing professional skills under the guidance of a certified cooperating field professional and college supervisor. Taken by HSL majors not in teacher preparation.
- HSL 1801 Supervised Field Experience 2** 6 QH
Includes supervision, evaluation conferences, and seminars as an integral part of this experience. When combined with another approved field-based course (HSL 1800 or HSL 1802), offers assignment in a field setting related to the student's area of study within the curriculum, including observing and performing professional skills under the guidance of a certified cooperating field professional and college supervisor.
- HSL 1802 Supervised Student Teaching 1** 6 QH
Provides a supervised teaching experience in an approved school in which the student assumes clear instructional responsibilities for at least half of the time and full teaching responsibilities for a substantial period of time under the guidance of a certified cooperating teacher and college supervisor. Must be at the level of the teacher certification sought. Includes supervision, evaluation conferences, and seminars as an integral part of this experience. Taken by stu-

dents who wish to apply for teacher certification. Allows a minimum of 300 clock hours for teacher certification to be achieved when the student successfully completes this course and HSL 1801 or HSL 1803. These courses should be taken in the same quarter.

HSL 1803 Supervised Student Teaching 2 6 QH

Provides a supervised teaching experience in an approved school in which the student assumes clear instructional responsibilities for at least half of the time and full teaching responsibilities for a substantial period of time under the guidance of a certified cooperating teacher and college supervisor. Must be at the level of the teacher certification sought. Includes supervision, evaluation conferences, and seminars as an integral part of this experience. Taken by students who wish to apply for teacher certification. Allows a minimum of 300 clock hours for teacher certification to be achieved when the student successfully completes this course and HSL 1801 or HSL 1802. These courses should be taken in the same quarter.

HSL 1805 Supervised Student Teaching 3 6 QH

Extends HSL 1802 and HSL 1803 to accommodate students pursuing certification at two levels and who require the additional student teaching practicum of an additional 150 hours. May also be used by student teachers needing extra involvement to meet certification standards not met during HSL 1802 and HSL 1803.

HSL 1863 TAC — Special Problems 2 QH

Presents directed study in analysis and coaching of a sport or activity not offered by the department or in special scheduling situations, for example, field hockey, football, lacrosse, wrestling. *Prereq.* Permission of instructor.

Medical Laboratory Science

MLS 1101 Medical Laboratory Science Orientation 1 1 QH

Focuses on the history and development of the medical lab science profession; includes an introduction to medical terminology.

MLS 1102 Medical Laboratory Science Orientation 2 1 QH

Continues discussion of topics introduced in MLS 1101, with the addition of a review of mathematics and metric-unit calculations.

MLS 1104 Laboratory Techniques 3 QH

Covers the principles and theories of basic technical skills needed to work competently in a clinical or research laboratory. Discusses issues concerning laboratory safety, aseptic technique, OSHA regulations, quality control, quality assurance, solution preparation, and method evaluation and applies them in a laboratory component. *Prereq.* CHM 1122.

MLS 1109 Foundations of Clinical Laboratory Science 4 QH

Examines basic lab methods employed in primary care, including urinalysis, gram staining, hematocrit, hemoglobin, sedimentation rate, white cell count, and differential. *Prereq.* Admission to physician assistant program or permission of instructor.

MLS 1112 Renal Physiology and Urinalysis 2 QH

Introduces basic medical laboratory science. Examines principles and theories of renal physiology. Emphasizes techniques for chemical and microscopic detection of normal and abnormal urinary tract constituents. *Prereq.* BIO 1107 and CHM 1111.

MLS 1125 Hematology 4 QH

Examines basic hematology procedures and principles. Emphasizes hematopoiesis, hematologic cell maturation, normal and abnormal cell morphology, basic hemostasis, and coagulation testing. *Prereq.* BIO 1107, CHM 1122. Formerly MLS 1123 and MLS 1124.

MLS 1132 Immunohematology 3 QH

Teaches the principles of immunohematology with specific application to the ABO and Rh blood group system, antibody detection, and crossmatch design. Studies basic blood bank techniques including blood typing and crossmatching. Replaces immunohematology lecture portion of MLS 1131. *Prereq.* BIO 1107, MLS 1171, and MLS 1271.

MLS 1145 Microbiology 4 QH

Introduces the principles and techniques of organism isolation, cultivation, and identification from clinical specimens. Discusses identifying bacteria that are pathogenic for humans according to the isolated organism's clinical specimen. Emphasizes how to collect and transport specimens, what laboratory protocols to use in diagnosis, and procedures for identifying organisms. *Prereq.* BIO 1107, CHM 1122, and MLS 1172. Formerly MLS 1142 and MLS 1144.

MLS 1152 Clinical Chemistry and Instrumentation 4 QH

Covers the principles of clinical chemistry with application to procedures and techniques. In laboratory work, emphasizes the clinical significance and common methods of quantitating selected important analyses. Replaces lecture portion of MLS 1151. *Prereq.* CHM 1122, and MLS 1112 or MLS 1311.

MLS 1172 Immunology 2 QH

Covers the basic concepts of medical immunology, including relationships among disease, immune response, and laboratory procedures. Encompasses the concepts of antigen and antibody structure and relationship, and specific and non-specific host response. Covers common laboratory methods for the detection of antigens and antibodies.

MLS 1212 Urinalysis Laboratory 1 QH Laboratory for MLS 1112.

MLS 1225 Hematology Laboratory 1 QH Laboratory for MLS 1125.

MLS 1232 Immunohematology Laboratory 1 QH Laboratory for MLS 1132.

MLS 1245 Microbiology Laboratory 1 QH Laboratory for MLS 1145.

MLS 1252 Clinical Chemistry and Instrumentation Laboratory 1 QH Laboratory for MLS 1152.

MLS 1412 MLT Special Topics—Applied Microscopy 2 QH Offers clinical practicum in applied urinalysis, parasitology, and mycology at an affiliated hospital providing MLT(ASCP)- and CLT(NCA)-level instruction. *Prereq.* Admission to MLT Clinical Program.

MLS 1423 MLT Applied Study in Hematology 2 QH Offers clinical practicum in hematology and coagulation at an affiliated hospital providing MLT(ASCP)- and CLT(NCA)-level instruction. *Prereq.* Admission to MLT Clinical Program.

MLS 1432 MLT Applied Study in Blood Banking 2 QH
Offers clinical practicum in blood banking at an affiliated hospital providing MLT(ASCP)- and CLT(NCA)-level instruction. *Prereq. Admission to MLT Clinical Program.*

MLS 1442 MLT Applied Study in Clinical Microbiology 2 QH
Offers clinical practicum in microbiology at an affiliated hospital providing MLT(ASCP)- and CLT(NCA)-level instruction. *Prereq. Admission to MLT Clinical Program.*

MLS 1452 MLT Applied Study in Clinical Chemistry 2 QH
Offers clinical practicum in clinical chemistry at an affiliated hospital providing MLT(ASCP)- and CLT(NCA)-level instruction. *Prereq. Admission to MLT Clinical Program.*

MLS 1480 MLT Seminar 1 2 QH
Offers a basic introduction to correlation of laboratory findings in hematology, blood banking, microbiology, and clinical chemistry, with appropriate referrals of lab information in working situation. Examines basic use of quality control. *Prereq. Admission to MLT Clinical Program.*

MLS 1523 Hematology MT Applied Study 4 QH
Offers clinical practicum in applied hematology at an affiliated hospital providing for MT(ASCP)- and CLS(NCA)-level instruction. *Prereq. Admission to MT Clinical Program.*

MLS 1533 Immunohematology MT Applied Study 4 QH
Offers clinical practicum in applied immunohematology at an affiliated hospital providing MT(ASCP)- and CLS(NCA)-level instruction. *Prereq. Admission to MT Clinical Program.*

MLS 1544 Clinical Microbiology MT Applied Study 7 QH
Offers clinical practicum in applied microbiology at an affiliated hospital providing MT(ASCP)- and CLS(NCA)-level instruction. *Prereq. Admission to MT Clinical Program.*

MLS 1552 Clinical Chemistry MT Applied Study 7 QH
Offers clinical practicum in applied clinical chemistry at an affiliated hospital providing MT(ASCP)- and CLS(NCA)-level instruction. *Prereq. Admission to MT Clinical Program.*

MLS 1573 Clinical Immunology MT Applied Study 1 1 QH
Offers clinical practicum in applied clinical immunology at an affiliated hospital providing MT (ASCP)- and CLS (NCA)-level instruction. *Prereq. Admission to MT Clinical Program.*

MLS 1574 Clinical Immunology MT Applied Study 2 1 QH
Continues MLS 1573.

MLS 1621 Advanced Hematology 1 3 QH
Studies physiology of blood cells and bone marrow; reviews physiology of blood hemopoiesis; discusses hematologic results as they relate to normal, anemic, and leukemic conditions. *Prereq. MLS 1124 or permission of instructor.*

MLS 1623 Special Topics: Hemostasis 1 QH
Offers advanced studies in hemostasis, emphasizing identifying factors and solving hemostatic problems. *Prereq. MLS 1124 or permission of instructor.*

MLS 1631 Advanced Immunohematology 2 QH
Examines blood group systems, antibody identification, and advanced immunohematologic principles and procedures. Presents case studies. *Prereq. MLS 1332 or MLS 1132.*

MLS 1648 Advanced Clinical Microbiology 4 QH
Examines host and microbial interactions in disease produced by viruses, rickettsia, chlamydia, mycoplasma, mycobacteria, anaerobic bacteria, and actinomyces. Also covers host and microbial interactions in gastrointestinal, genitourinary, and respiratory tract infections. Discusses disease states, diagnostic procedures, and antimicrobial testing. Combines MLS 1645 and MLS 1646. *Prereq. MLS 1142 and MLS 1143.*

MLS 1649 Medical Parasitology and Mycology 3 QH
Discusses the parasites and fungi that are pathogenic to man, including pathogenesis, relevant clinical symptoms, and diagnostic criteria. Emphasizes the laboratory procedure used in their diagnosis and organism characteristics used for identification. *Prereq. BIO 1107 or instructor's permission.*

MLS 1656 Advanced Clinical Chemistry 4 QH
Discusses advanced principles of clinical chemistry and some instrumentation, as well as acquisition, management, and application of laboratory data. Studies methods of quantitating clinically significant analytes, including pathophysiology of related disease states. *Formerly MLS 1654 and MLS 1655.*

MLS 1661 Medical Laboratory Science Education 2 QH
Surveys current topics in medical lab science education: developing objectives, methods of evaluation and certification, clinical instruction and evaluation, medical lab science curricula, and use of media and other methods of instruction. *Prereq. Completion of clinical program.*

MLS 1662 Clinimetrics 2 QH
Covers measuring and improving the quality of all steps in the total testing process. Combines Deming's principles of industrial quality management with traditional practices in clinical laboratory quality assurance programs. Discusses design strategies including ordering tests, selecting methods, monitoring analytic quality, and interpreting and reporting tests. Examines each strategy's effectiveness. *Prereq. Completion of MLS clinical applied study.*

MLS 1665 Medical Laboratory Management 2 QH
Surveys factors that relate to effective lab administration: hospital organizational structure, principles of management and supervision, cost accounting, purchasing, inspection guidelines, legal responsibilities, and personnel relations. *Prereq. Completion of clinical program.*

MLS 1672 Immunopathology 3 QH
Covers the situations in which the host defense response produces the symptoms of disease. Discusses conditions that result from immunodeficiency. Explains the role of the immune system in transplant rejection. Describes neoplasms of the immune system and discusses laboratory procedures used in the diagnosis and management of these conditions. *Prereq. MLS 1171.*

MLS 1680 MLS Special Topics 2 QH
Discusses current topics in the clinical lab. *Prereq. MLS 1111, MLS 1121, MLS 1122, MLS 1131, MLS 1141, and MLS 1151.*

MLS 1681 MLS Senior Seminar 2 QH
Reviews current undergraduate medical lab science topics.

MLS 1890 Undergraduate Research 2 QH
Examines special problems in lab medicine involving individual research under the direction of a faculty member. *Prereq. Permission of instructor.*

MLS 1891 MLS Current Concepts

Discusses topics determined by recent advances in medical laboratory science.

1 QH

Pharmacy

PAH 1101 Health Career Seminar

Provides students with the opportunity to determine their career goals in the health professions through activity-oriented classes and discipline-specific career information. Addresses self-assessment, career exploration, decision making, and goal implementation. Allows students to gather information about the five majors within the Bouvé College of Pharmacy and Health Sciences.

1 QH**PAH 1135 Professional Dynamics in the Health Care Delivery System**

Examines the evolution of the American health care delivery system, with emphasis on current aspects of how health care is delivered, how it is financed, where it is delivered, and who delivers it. Discusses present and future influences in health, including health promotion, disease prevention, and environmental issues. Considers unique and collective health professional roles and responsibilities, humanistic/behavioral dimensions of health care, professional organizations, and professionalism.

4 QH**PAH 1202 Anatomy-Physiology 1**

Covers structure and function of cells, tissues, and organs, including the muscular, immune, and nervous systems. Includes survey of human anatomy and physiology using experiments, specimens, and computer simulation. Oriented to students in the health professions. Lab fee. *Prereq.* CHM 1122 or CHM 1102, and BIO 1107.

5 QH**PAH 1204 Anatomy-Physiology 2**

Covers structure and function of the various life-supportive systems not covered in the first quarter. Includes survey of human anatomy and physiology using experiments, specimens, and computer simulation. Oriented to students in the health professions. Lab fee. *Prereq.* PAH 1202 or permission of instructor.

5 QH**PAH 1210 Anatomy-Physiology 1**

Offers students the opportunity to take the lecture portion only of PAH 1202. *Prereq.* Permission of instructor.

4 QH**PAH 1211 Anatomy-Physiology Laboratory 1**

Offers students the opportunity to take the lab portion only of PAH 1202. *Prereq.* Permission of instructor.

1 QH**PAH 1212 Anatomy-Physiology 2**

Offers students the opportunity to take the lecture portion only of PAH 1204. *Prereq.* Permission of instructor.

4 QH**PAH 1213 Anatomy-Physiology Laboratory 2**

Offers students the opportunity to take the lab portion only of PAH 1204. *Prereq.* Permission of instructor.

1 QH**PAH 1280 Biochemistry**

Introduces the structures, functions, and metabolism of amino acids, proteins, carbohydrates, lipids, and nucleic acids. Discusses the mechanisms of enzyme reactions, enzyme kinetics, vitamins, biological oxidation reduction reactions, and bioenergetics, as well as various inborn errors of metabolism. *Prereq.* CHM 1268 and CHM 1269.

5 QH**PAH 1776 Junior/Senior Honors Thesis**

Provides students with the opportunity to become involved with faculty on either ongoing research projects or student-initiated scholarly activities. Encourages and assists students in writing, presenting, and publishing their research. Allows students to gain an awareness and some understanding of a discipline or area of study in the allied health professions while developing an appreciation for research methods and the process of scientific inquiry. Requires a junior/senior thesis. *Prereq.* Honors participation.

4 QH**PAH 1777 Honors Adjunct**

Designed to be attached to a predesignated professional course in the student's major and offered at the discretion of the faculty member(s) teaching the course. For further details, contact the honors office (1 NI) or PAH honors advisor. *Prereq.* Honors participation and permission of instructor.

1 QH**PAH 3214 Advanced Pathophysiology/Pharmacotherapeutics 1**

Examines the pathophysiology of major disease states as it relates to the development of a patient-oriented pharmacotherapeutic plan. Emphasizes the role of disease pathophysiology, etiology, clinical signs and symptoms, and diagnosis in the selection, initiation, and monitoring of therapeutic drug regimens. Allows students to develop skills in case evaluation by the application of lecture material to patient-specific cases through weekly seminars. Covers cardiology, nephrology, and transplantation. *Prereq.* PharmD students.

5 QH**PAH 3215 Advanced Pathophysiology/Pharmacotherapeutics 2**

Continues discussions introduced in PAH 3214. Covers infectious diseases, pulmonary, neurology, nutrition, and gastrointestinal diseases. *Prereq.* PharmD students.

5 QH**PAH 3216 Advanced Pathophysiology/Pharmacotherapeutics 3**

Continues discussions introduced in PAH 3214 and PAH 3215. Covers hematology, oncology, pediatrics and neonatology, obstetrics, and gynecology. *Prereq.* PharmD students.

5 QH**PAH 3217 Pharmacoeconomics**

Applies various pharmacoeconomic techniques to an analysis of drug therapy and other pharmacy related issues. Examines the role of quality of life and therapeutic outcomes in pharmacoeconomic evaluations. Investigates the value of pharmacoeconomic studies. *Prereq.* PharmD students.

3 QH**PAH 3322, PAH 3323, PAH 3324, PAH 3325****Clinical Clerkship 1, 2, 3, 4**

Provides experiential rotations in specialty areas of contemporary pharmacy practice where the student can apply knowledge to delivery of patient care. Offers students the opportunity to demonstrate skills in the areas of communication, critical thinking and problem solving, and patient-oriented care through observation and performance. *Prereq.* PharmD students.

9 QH**PAH 3330 Institutional Experience**

Provides experiential rotation in a contemporary institutional setting where students have the opportunity to further develop knowledge of and demonstrate pharmacy practice skills. Focuses on delivery of patient-oriented care, management and evaluation of pharmacy operations and medication distribution systems, and provision of additional professional services. *Prereq.* PharmD students.

4 QH

PCL 1306 Pharmacodynamics 1**2 QH**

Introduces pharmacologic principles, with the individual pharmaceuticals of drug groups and individual pharmaceuticals of particular importance in the diagnosis and treatment of disease. Focuses primarily on the applications of such principles and agents to the nursing profession. *Prereq.* BIO 1120, BIO 1255, CHM 1111, and CHM 1112.

PCL 1307 Pharmacodynamics 2**2 QH**

Continues the topics introduced in PCL 1306. *Prereq.* PCL 1306.

PCL 1409 Pharmacology for the Respiratory-Care Practitioner**4 QH**

Provides an orientation to pharmacology, including the scope of pharmacology; definitions; drug standards; drug legislation; names, sources, and active constituents; and pharmaceutical preparations of drugs relating to the respiratory-care practitioner.

PCL 1420 Pharmacology/Medicinal Chemistry 2**6 QH**

Continues discussion of topics introduced in PMC 1419. Presents an interdisciplinary chemical and pharmacological approach to understanding drug action. Deals principally with drugs affecting the peripheral nervous, cardiovascular, and renal systems. *Prereq.* PMC 1419 and middler standing.

PCL 1422 Pharmacology/Medicinal Chemistry 3**6 QH**

Continues discussion of topics in PCL 1420. Covers the medicinal chemistry and pharmacology of drugs acting on the gastrointestinal, endocrine, reproductive, and hematopoietic systems, along with autacoids, and antineoplastics. *Prereq.* PCL 1420 and junior standing.

PCL 1451 Pharmacology Laboratory**1 QH**

Provides experience in systematically monitoring the qualitative effects of selected drugs. Studies quantitative characteristics of drug dose-response relationships, factors influencing such relationships, and methods of calculating and reporting such data. Lab fee. *Prereq.* PMC 1419 and middler standing.

PCL 1801, PCL 1802, PCL 1803**4 QH each****Special Research Project (Pharmacology)**

Provides opportunity for directed study or research in pharmacology/toxicology wherein the student may undertake in-depth investigation of an area of specialized interest. Lab fee. *Prereq.* Permission of instructor and program director.

PCT 1240 Pharmaceutical Calculations**4 QH**

Introduces the application of mathematical concepts in pharmacy. Emphasizes systems of measurement and basic arithmetic calculations as they relate to the practice of pharmacy. Also introduces statistical analysis methods required for subsequent courses in pharmaceuticals and for improving problem-solving skills using computers. *Prereq.* CHM 1122, MTH 1108.

PCT 1300 Dosage Forms**4 QH**

Focuses on the formulation and administration of pharmaceutical preparations. Emphasizes pharmaceutical dosage forms, including both industrial formulation and extemporaneous compounding. *Formerly* PCT 1350 *Pharmaceuticals 2*. *Prereq.* MTH 1108, PHY 1203, CHM 1265, and PCT 1240 or concurrent enrollment and middler standing.

PCT 1320 Dosage Forms Laboratory**2 QH**

Focuses on the application of the fundamental principles and techniques of pharmaceuticals to the lab preparation and use of

various pharmaceutical products. Lab fee. *Formerly* *Pharmaceuticals Laboratory 2*. *Prereq.* PCT 1240 and PCT 1300 or concurrent enrollment and middler standing.

PCT 1340 Physical Pharmacy**4 QH**

Focuses on the study of physiochemical theories and principles and their application to pharmaceutical systems. Covers thermodynamics, ionic equilibria, solubility, complexation, interfacial phenomena, rheology, coarse dispersion, diffusion and membrane transport, and chemical kinetics. *Formerly* *Pharmaceuticals 1*. *Prereq.* PCT 1240, PCT 1300, PCT 1320, and middler standing.

PCT 1360 Physical Pharmacy Laboratory**2 QH**

Focuses on the physiochemical principles and techniques of pharmaceutical preparations and their relationship to quality control and biopharmaceutics and pharmacokinetics. *Formerly* *Pharmaceuticals Laboratory 1*. *Prereq.* PCT 1240, PCT 1300, PCT 1320, and PCT 1340 or concurrent enrollment and middler standing.

PCT 1440 Biopharmaceutics/Pharmacokinetics**4 QH**

Acquaints students with biopharmaceutics and basic pharmacokinetics. Discusses dissolution, disintegration, general concept of one- and two-compartment models; linear and nonlinear pharmacokinetics; drug kinetics after intravenous, intramuscular, or oral administration; practical methods of one-compartment model utilizing urinary data; bioavailability; multiple-dosing kinetics; and general approaches to dosage adjustment in disease states. *Prereq.* MTH 1108, PAH 1204, PAH 1280, PCT 1240, PCT 1300, PCT 1320, PCT 1340, PCT 1350, and junior standing.

PCT 1801, PCT 1802, PCT 1803**4 QH each****Pharmaceutics Special Research Project**

Provides opportunity for directed study or research in one of the pharmaceutical sciences, wherein the student may undertake in-depth investigation of an area of specialized interest. Lab fee. *Prereq.* Permission of instructor(s) and program director.

PHP 1102 The Profession of Pharmacy**2 QH**

Introduces pharmacy freshman students to the profession of pharmacy. Discusses pharmacist roles in health care delivery, pharmacy demographics, drug component of health care, pharmacy education, pharmacy law, ethics and professionalism, and professional pharmacy associations.

PHP 1301 Pharmaceutical Jurisprudence**4 QH**

Offers a comprehensive analysis and interpretation of laws relating to the practice of pharmacy. Discusses federal and state food and drug laws, narcotics laws, Medicare and Medicaid regulations, and state pharmacy laws. *Prereq.* Junior standing.

PHP 1302 Pharmacy Administration 1**4 QH**

Covers contemporary administrative aspects of pharmacy: trends in contemporary practice, third-party payment plans, macroeconomic impact on the profession, and the impact of current health care issues on pharmacy. *Prereq.* Senior standing or permission of instructor.

PHP 1303 Interpersonal Skills for Health Professionals**4 QH**

Applies the skills of interpersonal communication to situations encountered in various health care settings. Provides students with an opportunity to learn to integrate specific technical competence with serious concern for personal, social, and cultural factors in illness and health care. Through the use of medical

sociology literature, audio-visual materials, case analyses, and personal reflection on actual patient encounters, provides the students with an opportunity to improve interpersonal communication skills and to increase their understanding of practitioner-patient relationships, patient's needs and responses in illness and treatment, and professional behavior in practice settings.

PHP 1306 Community Pharmacy Management 4 QH

Focuses on the management requirements for establishing a community pharmacy. Analyzes the prevailing types of organizations, locations, leases, business organization, staffing, plant layout and design, and financial factors. *Prereq.* Senior standing or permission of instructor.

PHP 1314 Pharmacy Care Management 4 QH

Focuses on the managerial and administrative skills required by a contemporary pharmacist practicing in either a community or hospital setting. Discusses classical management principles of planning, decision making, organizing, hiring, and controlling. Covers aspects of managing pharmacy business growth such as marketing, market research, advertising, pricing, reimbursement, resource utilization, and inventory control. Uses a case study method throughout as an interactive teaching tool. Incorporates in lectures and case materials current events in pharmacy, future characteristics of pharmacy practice, national health care, quality assurance, and risk management.

PHP 1401 Drug Information and Evaluation 3 QH

Introduces the principles and practice of drug information. Covers the levels of practice, the availability of therapeutic reference sources, the use of abstracting and indexing systems, how to respond to drug information questions, and basic statistical data required to help understand, interpret and evaluate the medical and pharmaceutical literature. *Prereq.* Fourth-year standing or permission of instructor.

PHP 1402 Parapharmaceuticals 2 QH

Focuses on the nature and application of various surgical devices, appliances, bandages, home health care products, and hospital and sickroom supplies and on monitoring equipment in the provision of pharmacy care.

PHP 1411 Pathophysiology 4 QH

Focuses on basic concepts of pathophysiology for pharmacy, toxicology, and respiratory therapy majors, emphasizing disease processes and alterations of normal organ functions. *Prereq.* PAH 1202, PAH 1204, and middler standing.

PHP 1441 Therapeutic Drug Monitoring 4 QH

Covers the monitoring, developing, and modifying of drug dosage regimens and the pharmacokinetic factors influencing the regimen selection for various therapeutic drug categories. *Prereq.* PCT 1440 and junior standing.

PHP 1501 Ambulatory Pharmacy Externship 4 QH

Involves a 400-hour (10 weeks x 40 hours/week) structured practicum in community pharmacy. Includes applied aspects of community pharmacy management; medication dispensing; and patient-oriented services such as prescription and nonprescription medication, consultation, and patient-profile monitoring. *Prereq.* Satisfactory completion of all professional courses through quarter 9.

PHP 1503 Professional Practice Laboratory 1 QH

Focuses on compounding and dispensing medications in both institutional and ambulatory pharmacy settings. Emphasizes patient counseling techniques and monitoring appropriateness of therapy. *Prereq.* Satisfactory completion of all professional courses through quarter 9.

PHP 1505 Hospital Pharmacy Externship 4 QH

Provides students with the learning experience needed to develop competency in the delivery of pharmacy services within a hospital setting. The student will receive information and hands-on experience in all phases of inpatient and outpatient dispensing; monitoring drug utilization; hospital committee activities; utilizing hospital reference material; and hospital managerial skills and procedures. *Prereq.* PHP 1609 and senior standing. Taken at the same time as PHP 1506.

PHP 1506 Clinical Pharmacy Clerkship 8 QH

Involves assignment to a clinical site for five full days per week to observe patient response to medication and to evaluate and advise on all factors that may modify efficacy, safety, and economy of therapy. Offers campus seminar with student presentations on current therapeutic topics. *Prereq.* PHP 1609 and senior standing.

PHP 1601 Nonprescription Medication 4 QH

Provides an overview of the types of over-the-counter (OTC) medications. Discusses correct use precautions and adverse effects in a variety of patient populations. Addresses the issue of counseling different types of patients. *Prereq.* Junior standing.

PHP 1603 Selected Topics in Clinical Pharmacy I 4 QH

Helps students increase their understanding of selected diseases. Examines pathophysiology and diagnosis of the illness as well as drug therapy and its relation to patient compliance and education. Provides greater depth than existing clinical pharmacy courses. *Prereq.* Permission of instructor.

PHP 1604 Selected Topics in Clinical Pharmacy 2 4 QH

Helps increase the student's knowledge of selected disease entities. Examines pathophysiology and diagnosis of the illness as well as drug therapy and its relation to patient compliance and education. Provides greater depth than existing clinical pharmacy courses. *Prereq.* Permission of instructor.

PHP 1605 Introduction to Sterile Products 4 QH

Introduces pharmacists' role in manufacturing and using sterile products. Covers intravenous incompatibilities, aseptic technique, sterile room equipment, quality control, safe handling of cancer chemotherapeutic agents, and sterile product room systems and design. Discusses a variety of sterile products, including parenteral nutrition, small and large volume parenterals, irrigating solutions, cancer chemotherapeutic agents, and ophthalmic preparations. Emphasizes developing an ability to interact with other health professionals. Offers experience using laboratory equipment to prepare sterile products. *Prereq.* Fourth- or fifth-year pharmacy majors only.

PHP 1607 Cancer Chemotherapeutics 4 QH

Emphasizes the role of chemotherapy in the management of malignant disease. Discusses clinical applications of specific chemotherapeutic agents, with the remainder of the course concentrating on specific disease states. Covers related topics such

as pain control in cancer patients, control of nausea and vomiting, principles of cancer research, cancer quackery, and adverse effects of chemotherapy. *Prereq.* Fourth-year pharmacy major or permission of instructor.

PHP 1609 Pharmacotherapeutics 6 QH

Examines the drug therapies of the major disease states. Covers selected cardiovascular, respiratory, hepatic, renal, and endocrine disorders. *Prereq.* PCL 1420, PCL 1422, PCT 1440, PMC 1419, PMC 1421, and junior standing.

PHP 1612 Special Topics in Pharmacy Administration 2 QH

Discusses in-depth a selected topic in the area of pharmacy administration. Topics include business, professional, and environmental management/administrative aspects of pharmacy practice in all settings. *Prereq.* Junior or senior pharmacy majors only.

PHP 1614 Special Topics in Pharmacy Administration 4 QH

Discusses in-depth a selected topic in pharmacy administration. Topics include business, professional, and environmental management/administrative aspects of pharmacy practice in all settings. *Prereq.* Junior or senior pharmacy majors only.

PHP 1615 Clinical Immunology 3 QH

Reviews basic immunology in preparation for in-depth consideration of immunological disorders and diseases related to major histocompatibility complex, autoantigens, autoimmunity serum sickness, hypersensitivity (allergy and asthma) immunodeficiency diseases, and immunodiagnostics and immunotherapy in cardiovascular and oncological applications. Describes various *in vitro* and *in vivo* immunological reagents used in diagnosis and therapy, including monoclonal antibodies, immunomodulators, and other innovative (experimental) approaches such as immunotoxins and immunoliposomes.

PHP 1801, PHP 1802, PHP 1803, PHP 1804 4 QH each
Special Research Project

Provides opportunity for directed study or research in clinical pharmacy or pharmacy administration, wherein the student may undertake in-depth investigation of an area of specialized interest. *Prereq.* Permission of instructor.

PHP 1805 Special Research Project 3 QH

Offers directed study or research in pharmacy administration, allowing for the in-depth investigation of an area of special interest. *Prereq.* Permission of instructor.

PHP 1806 Special Research Project 2 QH

Same as PHP 1805.

PMC 1322 Pharmaceutical Biotechnology 3 QH

Introduces the principles of immunology and molecular biology and discusses their applications to the design, development, and use of biopharmaceuticals. Topics include small and large peptides, antibodies, and factors. *Prereq.* PAH 1280, CHM 1269.

PMC 1419 Medicinal Chemistry/Pharmacology I 5 QH

Introduces the principles of pharmacology and medicinal chemistry. Discusses the major drug classes affecting the central nervous system, including anxiolytics, sedative-hypnotics, anesthetics, anticonvulsants, neuroleptics, antidepressants, and narcotic analgesics. Considers therapeutic indications, mechanisms

of action, structure-activity relations, and undesirable actions including drug abuse. *Prereq.* BIO 1107, CHM 1269, PAH 1202, PAH 1204, and middler standing.

PMC 1421 Antiinfectives 5 QH

Presents an integrated approach to the study of antiinfective agents. Emphasizes the biochemical basis for the action mechanism of antibacterial, antifungal, and antiviral agents; the chemistry of representative members of the major classes of antiinfective agents; and the pharmacology, pharmacokinetics, and therapeutic applications of drugs used to treat bacterial, fungal, and viral infections. Discusses the AIDS epidemic with a focus on investigating new drugs and treatment modalities that may be valuable in either preventing HIV replication or in the therapy of opportunistic infections. *Prereq.* BIO 1121, CHM 1269, PAH 1280, PMC 1419, and junior standing.

PMC 1801, PMC 1802, PMC 1803 4 QH each

Special Research Project (Medicinal Chemistry)

Offers directed study or research in one of the medicinal chemistry areas, wherein students may undertake in-depth investigation of an area of specialized interest. Lab fee. *Prereq.* Permission of instructor and program director.

Physical Therapy

PTH 1007 Cooperative Education in Physical Therapy 1 QH

Introduces students to cooperative education and its implications for career planning in physical therapy.

PTH 1114 Introduction to Physical Therapy I 2 QH

Provides orientation to the field of physical therapy and its role in the health professions. Explores theory and practice in applied body mechanics and basic procedures related to patient management.

PTH 1118 Developmental Base of Human Performance 4 QH

Studies the growth and development of perceptual-motor skills from birth to old age. Considers age expectations for perceptual-motor behavior, focusing on the processes underlying developmental changes.

PTH 1202 Therapeutic Modalities in Physical Therapy Practice 3 QH

Provides practice in preparing patients and equipment for various treatment procedures using physical agents. Includes theory, demonstration, and practice in applying heat and cold modalities, hydrotherapy, ultraviolet and laser light therapies, and electrotherapy. *Prereq.* PTH 1114.

PTH 1310 Clinical Gross Anatomy 6 QH

Covers the structure and function of the human body, with particular emphasis on the skeletal, muscular, nervous, and vascular components of each region. Involves lectures, cadaver dissection, osteology labs, and surface anatomy palpation to investigate basic human anatomy and the clinical applications of anatomy lab. *Prereq.* BIO 1152, BIO 1153, and BIO 1154.

PTH 1316 Neuromuscular Physiology 4 QH

An in-depth study of neuromuscular physiology, motor control, and motor learning, with applications to physical therapy practice. *Prereq.* BIO 1152, BIO 1153, BIO 1154, and PTH 1202.

- PTH 1320 Soft Tissue Mobilization** 2 QH
Offers theory, demonstrations, and practice of manual therapy integrated with other treatment procedures. Also covers anatomical and physiological theory and principles. Uses problem solving and case analyses. *Prereq.* BIO 1254, BIO 1255, and PTH 1202.
- PTH 1325 Clinical Medicine 1** 4 QH
Covers general medicine, lab medicine, and pathology as related to conditions commonly treated by physical therapists. *Prereq.* BIO 1152, BIO 1153, and BIO 1154.
- PTH 1330 Clinical Kinesiology** 5 QH
Studies normal movement through analysis of muscle and joint function. Also gives clinical applications for pathological movement. Includes lab. *Prereq.* PTH 1310 and PTH 1316.
- PTH 1335 Musculoskeletal Evaluation** 3 QH
Covers evaluation procedures, including theory, demonstration, practice, and planning. *Prereq.* PTH 1310, PTH 1316, and PTH 1320.
- PTH 1341 Musculoskeletal Therapeutic Exercise** 5 QH
Explores the theory, planning, and practice of basic therapeutic exercise. Discusses musculoskeletal as well as basic cardiovascular principles. Offers the opportunity to apply principles from other professional courses to design treatment programs using a systematic, problem-solving approach. *Prereq.* Satisfactory attainment in all prior professional courses.
- PTH 1345 Orthopedic Clinical Medicine 2** 3 QH
Focuses on orthopedic conditions and their medical, surgical, and physical therapy treatment. *Prereq.* PTH 1310, PTH 1316, and PTH 1325.
- PTH 1352 Psychosocial Aspects of Illness** 3 QH
Examines interpersonal relationships among patients, families, health professionals, and society, with reference to the impact of and reaction to illness. *Prereq.* Satisfactory attainment in all prior professional courses.
- PTH 1356 Prosthetics** 1 QH
Studies theory, demonstration, and current practice in prosthetics. *Prereq.* PTH 1316, PTH 1330, PTH 1335, PTH 1341, and PTH 1345.
- PTH 1360 Neurological Therapeutic Exercise** 4 QH
Presents theoretical basis and clinical application of integrated approaches to treatment of neurologically impaired clients. *Prereq.* Satisfactory attainment in all prior professional courses.
- PTH 1361 Neurological Assessment and Adult Neurology** 3 QH
Focuses on assessing problems of and setting goals for adults with neurological deficits. Covers the etiology, pathology, clinical signs, and medical management of neurological disorders. *Prereq.* Satisfactory attainment in all prior professional courses.
- PTH 1366 Neuroanatomy** 5 QH
Examines morphology and function of the human nervous system. Covers abnormalities of structure and function of the nervous system. Includes lecture and lab. *Prereq.* Satisfactory attainment in all prior professional courses.
- PTH 1370 Clinical Seminar** 2 QH
Discusses selected topics related to clinical aspects in physical therapy. Considers interpersonal relationships, ethics, teaching-learning process, communication, group dynamics, medical-legal issues, sociocultural/socioeconomic considerations, and clinical education information. *Prereq.* Satisfactory attainment in all prior professional courses.
- PTH 1380 Supervised Clinical Education 1** 5 QH
Introduces clinical experience that provides the student with opportunities to practice various skills in the evaluation and treatment of patients under supervision. Requires five weeks during Quarter 9 of the junior year in Massachusetts. *Prereq.* Satisfactory attainment in all prior professional courses.
- PTH 1386 Pediatric Neurology** 2 QH
Focuses on the pediatric and neurologic aspects of physical therapy practice. Reviews symptoms, conditions, and therapeutic/medical intervention. *Prereq.* Satisfactory attainment in all prior professional courses.
- PTH 1391 Cardiopulmonary Rehabilitation in Physical Therapy** 4 QH
Discusses the role of physical therapy in cardiac and pulmonary rehabilitation. Examines cardio-pulmonary evaluation techniques, etiology, and pathology of common cardiopulmonary disorders and physical therapy management. *Prereq.* Physical therapy students who have satisfactorily completed all prior professional courses, or respiratory therapy and cardiovascular specialist majors by permission of academic adviser.
- PTH 1392 Pathophysiology and Clinical Therapeutics** 1 QH
Covers selected topics in pathophysiology and clinical therapeutics related to current practice in physical therapy. *Prereq.* Satisfactory attainment in all prior professional courses.
- PTH 1396 Pediatric Evaluation/Treatment** 2 QH
Explores evaluating and treating the motor aspects of the neuro-muscularly impaired child. Focuses on analyzing normal movement patterns, recognizing movement dysfunction, and treating movement dysfunction. *Prereq.* Satisfactory attainment in all prior professional courses.
- PTH 1400 Administration** 4 QH
Explores concepts in administration and management applied to physical therapy. Involves seminar and discussion groups. *Prereq.* PTH 1380.
- PTH 1405 Research for Physical Therapy** 4 QH
Covers introduction to research design, basic statistics, analysis of scientific and medical literature, and preparation of an independent research proposal. *Prereq.* Satisfactory attainment in all prior professional courses.
- PTH 1411 Clinical Integration** 4 QH
Incorporates analysis and comparison of methods of physical therapy evaluation and treatment, with an emphasis on therapeutic exercise. Focuses on treatment planning for various problems, with emphasis on rationale and selection of treatment alternatives. Uses case study format and case simulations. *Prereq.* Satisfactory attainment in all prior professional courses.

PTH 1415 Supervised Clinical Education 2**0 QH**

Provides advanced clinical education by giving the student further opportunities to practice various phases of physical therapy under supervision in preparation for assuming the role of a qualified physical therapist. Involves a six-week assignment. Students may be assigned to clinics located outside of Massachusetts.

Prereq. Satisfactory attainment in all prior professional courses.

PTH 1416 Supervised Clinical Education 3**0 QH**

Continues PTH 1415. Provides an additional six-week assignment which gives students the opportunity to further refine their clinical skills under the supervision of a qualified physical therapist.

Students may be assigned to clinics located outside of Massachusetts. *Prereq.* Satisfactory completion of PTH 1415.

PTH 1420 Physical Therapy in the Health Care System**3 QH**

Examines major issues affecting the delivery of health care. Emphasizes the role of the physical therapist as a member of the health team. Involves class discussion and seminar. *Prereq.* PTH 1370 and PTH 1380.

PTH 1426 Functional Aspects of Aging**3 QH**

Discusses the interaction of psychological, social and physiological factors and their effects on the potential for function of the elderly client. Studies and designs assessment instruments.

Prereq. PTH 1370 and PTH 1380.

PTH 1453 Advanced Musculoskeletal Assessment and Treatment**3 QH**

Provides an opportunity to develop knowledge and skills in evaluating and treating joint dysfunction. Uses a problem-solving approach. *Prereq.* Satisfactory attainment in all prior professional courses.

PTH 1602 Special Topics in Physical Therapy**2 QH**

Offers innovative methods of instruction and deals with areas of special interest.

PTH 1604 Special Topics in Physical Therapy**4 QH**

Offers innovative methods of instruction and deals with areas of special interest.

PTH 1777 Honors Adjunct**1 QH**

Constitutes an addition to any three-, four-, five-, or six-quarter-hour course in the department when approved by the honors committee of the college. Once approved, the adjunct information is forwarded to the honors membership by the honors office. Allows students to enroll an unlimited number of times as an adjunct to any physical therapy course.

PTH 1800 Directed Study**2 QH**

Provides experience for the student whose unique academic needs or interests cannot be adequately satisfied in the basic, entry-level curriculum of the Department of Physical Therapy. *Prereq.* Permission of instructor, chair, and dean.

Speech-Language Pathology and Audiology**SLA 1101 Introduction to Speech and Hearing****4 QH**

Offers an overview of disorders of speech and hearing and their treatment, and a review of normal speech and hearing development. Requires clinical observations of persons with speech, language, and hearing disorders.

SLA 1200 Speech and Hearing Science**4 QH**

Presents concepts and information related to the physics of sound and principles of psychophysics and audition. Introduces the anatomical and physiological basis of speech sound production and the acoustic analysis of speech. Examines current theories and research in speech reception, perception, and production.

SLA 1201 Anatomy and Physiology of Vocal Mechanisms**4 QH**

Offers an in-depth study of the static structure, musculature, and physiology of the speech mechanism. Emphasizes current research in speech physiology. *Prereq.* SLA 1101.

SLA 1300 Language Acquisition**4 QH**

Analyzes the emerging semantic and syntactical aspects of language in normal and atypical children. Discusses current theory and research in language acquisition. Requires clinical observations of children with normal and atypical language patterns. *Prereq.* SLA 1101.

SLA 1301 Phonetics and Developmental Phonology**4 QH**

Offers basic training in auditory recognition and symbolization of phonemes and allophones in major American dialects. Stresses static and dynamic articulatory descriptions. Also includes a review of the developmental sequence of phonemic acquisition. *Prereq.* SLA 1101 and SLA 1201.

SLA 1303 Introduction to Audiology**4 QH**

Focuses on the basic techniques of audiometric testing and hearing conservation, including a review of basic hearing sciences and a prepracticum and laboratory experience in hearing testing.

SLA 1403 Clinical Procedures in Speech and Language**4 QH**

Reviews principles and procedures of the functional analysis of behavior. Focuses on applying behavioral theory and research to speech, language, and hearing training. Emphasizes clinical investigation in the experimental analysis of behavior, and offers experience applying experimental procedures in assessing and treating people with communication disorders.

SLA 1460 Neurological Bases of Communication**4 QH**

Provides an opportunity to acquire an understanding of neuroanatomy and neurophysiology as they relate to normal aspects of speech, hearing, and language.

SLA 1800 Directed Study**4 QH**

Provides study for the student whose unique academic needs or interests cannot adequately be satisfied in any of the scheduled courses of the department. Requires approval of the supervising faculty member, the chair, and the dean. Also requires that approval forms be submitted to the dean's office during the quarter prior to registration for the directed study. *Prereq.* Permission of instructor.

Toxicology

TOX 1100 Toxicology Orientation

1 QH

Introduces toxicology as it relates to regulatory, environmental, forensic, and clinical issues. Focuses on general principles of toxicology and their application to determining the hazards of toxicants in the workplace, the home, and the environment.

TOX 1101 Current Topics in Toxicology

1 QH

Discusses topics of interest to toxicology, pharmacy, biology, chemistry, nursing, and related majors. Selects topics from current research that span regulatory, public health, and environmental issues. Explores other toxicology-related topics.

TOX 1300 Clinical Toxicology

4 QH

Examines the potential toxicity of drugs, commercial products, and environmental agents. Focuses on clinical manifestations, mechanisms of toxicity, principles of treatment, and prevention of acute and chronic poisonings. *Prereq.* PMC 1418.

TOX 1301 Fundamental Principles of Systemic Toxicology

4 QH

Presents the principles of toxicology from an organ-system perspective. Focuses on the basic concepts used to evaluate toxicity, the mode of injury at the organ and cellular levels, and the basic subcellular mechanisms through which toxic agents produce damaging effects. Uses recent toxicological literature to introduce the concepts needed to evaluate toxicity through the analysis of data. *Prereq.* PMC 1418.

TOX 1302 Chemical and Analytical Toxicology

4 QH

Continues TOX 1301. Places additional emphasis on the interpretation of the toxicological literature to evaluate the risk involved from exposure to prototype chemicals. Uses structure activity and biochemical methods of assessment to evaluate the toxicity of major classes of chemical compounds. *Prereq.* PMC 1418 and TOX 1301.

TOX 1322 Biochemical Toxicology Laboratory

4 QH

Introduces the student to investigational methods for assessing toxicity; helps develop the student's ability to analyze and interpret data generated in the lab and in the literature; and helps the student develop technical writing skills. Uses rodents as a model for toxic insult. Examines hepatotoxicity, neurotoxicity, teratogenicity, and other toxic manifestations at the whole-animal, whole-tissue, and biochemical levels. *Prereq.* TOX 1300, TOX 1301, or TOX 1302.

TOX 1811, TOX 1812, TOX 1813 Toxicology Research

4 QH each

Students participate in faculty-directed research projects in the toxicology laboratory.

ROTC, Military Officers' Training Program

AIR 1110 Air Force Today 1

1 QH

Examines the role of the United States Air Force in the contemporary world. Surveys background, mission, and organization of the Air Force and functions of United States strategic forces. Also emphasizes development of written communicative skills.

Discusses organizational and personal values, management of forces in change, organizational power, politics, and managerial strategy and tactics in the context of the military organization. Uses actual Air Force cases to enhance the learning and communication processes.

AIR 1111 Leadership Laboratory 1

1 QH

Introduces the customs, traditions, and courtesies of the Air Force through guest speakers, seminars, and a field trip to an Air Force base.

AIR 1321 Leadership Laboratory 8

1 QH

Continues AIR 1311. Emphasizes supervisory and leadership skills. Discusses advantages of an Air Force career.

AIR 1120 Air Force Today 2

1 QH

Continues study of the contemporary Air Force by examining general-purpose forces, aerospace support forces, and the total force structure.

AIR 1410 United States National Security Forces 1

4 QH

Studies the role of the military in maintaining the security of the United States. Examines the international environment, the background of defense policy, strategy, and forms of conflict. Addresses specific issues, including weapons acquisition, arms control, nuclear deterrence, and the national military decision-making process.

AIR 1121 Leadership Laboratory 2

1 QH

Continues AIR 1111, with emphasis on the role and responsibilities of an Air Force company grade officer.

AIR 1411 Leadership Laboratory 5

1 QH

Focuses on exercise of management functions in planning, supervising, and directing cadet group activities. Provides opportunity to acquire proficiency in military leadership skills.

AIR 1210 Development of Air Power

1 QH

Traces the historical development of air power and its uses starting before the Wright Brothers and extending through the Korean War. Concentrates on the advent of the air age, the airplane at war (1914-1918), the interwar years, air power in World War II, the Berlin Airlift, air power in the Korean War, and the evolution of air power concepts and doctrine. Emphasizes student participation and presentations to enhance communicative skills.

AIR 1420 United States National Security Forces 2

4 QH

Studies the military's role as an institution in a democratic society. Includes such topics as civil-military interaction and the military as a profession. Emphasizes developing communicative skills through student presentation.

AIR 1211 Leadership Laboratory 3

1 QH

Emphasizes development of techniques used to direct and inform. Assigns students to leadership and management positions in the AIR 1111 programs previously described.

AIR 1421 Leadership Laboratory 6

1 QH

Continues AIR 1411. Gives students the opportunity to prepare themselves for professional duties.

AIR 1220 Development of Air Power

1 QH

Traces the historical development of air power and its uses starting after the Korean War and continuing through its present role in international policies. Students also begin five hours of introductory leadership. Continues emphasis upon student participation and presentations to enhance communicative skills.

ARM 1100 Leadership Laboratory 1

0 QH

Introduces first-year ROTC students to the basic tenets of discipline and regimentation of the United States Army. Includes the basics of proper wear of military clothing, proper rendering of military courtesies, military customs and traditions, individual and group drill and ceremonies, manual of arms for the M16A1 rifle, and physical fitness training.

AIR 1221 Leadership Laboratory 4

1 QH

Continues AIR 1211. Adds a special program in preparation for field training.

ARM 1101 Introduction to the Army

1.5 QH

Introduces the student to the U.S. Army. Subjects include customs and courtesies of the Army, Army traditions, rank structure and chain of command, wear and appearance of the uniform, branches of the Army, and the role of military power in the world today. Also introduces the Army writing style and physical fitness training.

AIR 1310 Management and Leadership 1

4 QH

Examines management and leadership from the point of view of the Air Force junior officer. Covers the individual motivational and behavioral processes, leadership, communication, and group dynamics to provide a foundation for the development of the junior officer's professional skills as an Air Force officer.

ARM 1102 Basic Leadership

1.5 QH

Teaches leadership and management concepts. Illustrates particular management skills: problem analysis and decision-making, planning and organizing, delegation and control, and interpersonal skills. Uses realistic management simulations and structured exercises to teach essential leadership skills.

AIR 1311 Leadership Laboratory 7

1 QH

Provides supervisory practice and exercise of leadership functions in controlling and directing activities of the cadet group. Develops leadership potential in a practical, supervised training lab.

ARM 1103 Basic Tactics

1.5 QH

Examines the mission, organization, and composition of the basic infantry rifle squad and platoon. Includes basic combat formations, movement techniques, unit capabilities, and planning considerations.

AIR 1320 Management and Leadership 2

4 QH

Continues AIR 1310 with special emphasis on the basic managerial processes involving decision making, use of analytical aid in planning, organizing, and controlling in a changing environment.

ARM 1200 Leadership Laboratory 2
0 QH

Presents introduction and hands-on training for second-year ROTC cadets. Includes required basic military skills, including nuclear, biological, and chemical protective training; selected weapons training; use of United States Army communications equipment; land navigation; orienteering, rappelling; and limited military vehicle maintenance training.

ARM 1201 Basic Rifle Marksmanship
1 QH

Provides instruction and practical application in basic rifle marksmanship techniques, safety, and range operations.

ARM 1202 Comparative Armies
1.5 QH

Presents an introduction to the roles and organization of the United States Army's Active, Reserve, and National Guard. Uses these concepts as building blocks to examine and compare armies currently affecting United States doctrine and tactics. Integrates the Soviet, Warsaw Pact, NATO, and other world forces into the course structure through the study and examination of current events inside and outside the military establishment.

ARM 1203 Health and Physical Fitness
1.5 QH

Presents information for the basic Army ROTC cadet on the components and principles of health, exercise, and physical fitness. Addresses basic health issues, emphasizing proper nutrition, weight control, and stress management. Introduces the student to exercise physiology including flexibility and stretching, cardiorespiratory fitness, and resistance and Nautilus equipment. Reviews methods to improve the cadet's individual score on the Army's physical fitness test.

ARM 1300 Leadership Laboratory
0 QH

Provides advanced leadership applications for the middler-year Army ROTC cadets. Includes the review and hands-on training of all basic military skills learned in the ROTC basic program of instruction. Gives middler cadets increased leadership responsibility within the cadet battalion for further development and evaluation as well as preparation for their junior year Camp All American platoon training.

ARM 1301 Land Navigation
2 QH

Presents advanced land navigation techniques to junior-year ROTC cadets. Introduces the topographic map and its commonly used symbols. Identifies common terrain features. Topics include measuring directional azimuths as well as straight line and road distance on a map; and converting azimuths, locating unknown points using the intersection, resection, and modified resection techniques. Requires the student to navigate using a map and compass.

ARM 1302 Advanced Tactics and Training
2 QH

Introduces the fundamentals of offensive and defensive combat at the squad and platoon levels. Includes unit organizations and capabilities, tactical planning, combat orders. Utilizes practical exercises placing the student in leadership roles in simulated tactical environments. Additionally, examines the proper method to conduct briefings, provide training input, and prepare, conduct, and evaluate training. *Prereq. Basic course completion.*

ARM 1303 Advanced Leadership Clinic
2 QH

Provides classroom, programmed instruction, and practical exercises (for example, land navigation, physical conditioning, weapons familiarization, and leadership) designed to prepare

cadets for maximum individual performance at the six-week ROTC advanced camp. Required for all cadets attending advanced summer camp at Fort Bragg, North Carolina. *Prereq. Basic course completion.*

ARM 1305 Advanced Leadership Laboratory 5
6 QH

Provides external leadership lab conducted at Fort Bragg, North Carolina, during the summer quarter. As an intensive six-week course, includes application of leadership principles in positions at varying levels of responsibility. Also includes supplemental instruction such as physical conditioning, counseling, senior-subordinate relations, tactical doctrine, international laws of land warfare, and approaches to problem solving. Course attended by students from 123 colleges and universities from Maine to Florida. All expenses borne by the United States government, including a stipend of approximately five hundred dollars.

ARM 1400 Leadership Laboratory 4
0 QH

Gives fourth-year ROTC cadets practical application of previously learned skills, techniques, education, and experience by assisting ROTC cadre in the conduct of ARM 1100, ARM 1200, and ARM 1300. Gives cadets an opportunity to prepare and present instruction, manage constrained resources, and supervise subordinates. Evaluates cadets based on active-duty Army criteria. Requires attendance by all fourth-year ROTC cadets enrolled in an ROTC course.

ARM 1401 Organization and Communications Skills
2 QH

Examines the theory, methods, and principles for understanding and motivating human behavior in organizations. Emphasizes the principles and dynamics of leadership. Directs those principles toward the development of leadership styles. Introduces the officer and noncommissioned officer evaluation system. Makes practical applications through the use of case studies and group processes. *Prereq. Basic course completion.*

ARM 1402 Military Law and Ethics
2 QH

Examines the issues and responsibilities imposed by law on commanders and staff officers in two broad areas: the military criminal justice system and military administrative law. Presents in-depth analysis of the responsibilities and duties of officers and noncommissioned officers operating in the military justice system. Focuses on the legal basis for command and on administrative due process, judicial review of military activities, and other topical issues. Gives students the opportunity to address and develop an understanding of the need for ethical conduct, and an awareness and sensitivity to ethical issues. *Prereq. Basic course completion.*

ARM 1403 Leadership Seminar and Ethics
2 QH

Provides senior ROTC cadets with need-to-know information that facilitates their entry into active duty. Also provides a forum for the study of personnel, training, logistical, and installation support systems. Discusses personal finances as well as the officer and noncommissioned officer evaluation systems. Gives students the opportunity to address and develop an understanding of the professional ethics of officership, including the need for ethical conduct, and an awareness of and sensitivity to ethical issues. *Prereq. Basic course completion.*

NAV 1100 Naval Science Laboratory
0 QH

Focuses on either drill instruction or practical work to complement classroom instruction. Must be taken in each class quarter by all NROTC nursing students.

NAV 1101 Introduction to Naval Science**3 QH**

Presents a general introduction to the naval profession and the concepts of seapower. Emphasizes the mission, organization, and warfare components of the United States Navy and Marine Corps. Includes an overview of officer and enlisted ranks and rates, training and education, and career patterns. Also covers naval courtesy and customs, military justice, leadership, and nomenclature. Exposes the student to the professional competencies required to become a naval officer.

NAV 1202 Seapower and Maritime Affairs**3 QH**

Surveys United States naval history from the American Revolution to the present with emphasis on major developments. Includes an in-depth discussion of the geopolitical theory of Mahan. Also treats present-day concerns in seapower and maritime affairs, including the economic and political issues of merchant marine commerce, the law of the sea, the Russian navy and merchant marine, and a comparison of United States and Soviet naval strengths.

NAV 1401 Leadership and Management 1**3 QH**

Studies at an advanced level organizational behavior and management in the context of the naval organization. Includes such topics as the management functions of planning, organizing, and controlling; individual and group behavior in organization; and motivation and leadership. Explores major behavioral theories in detail. Investigates practical applications by the use of experiential exercises, case studies, and lab discussions. Develops other topics, including decision making, communication, responsibility, authority, and accountability.

NAV 1402 Leadership and Management 2**3 QH**

Provides a foundation of leadership principles and management tools and skills to prepare and motivate students to confidently assume the responsibilities of a commissioned officer in the United States Navy. Reinforces leadership principles through leadership case studies with emphasis on core values, responsibility, accountability, loyalty, and professional ethics. Provides a basic background in the responsibilities of a junior division officer and watch officer with emphasis on training, counseling, career development, military law, and special programs. This is the capstone course of Naval Science.

Alternative Freshman-Year Program

ECN 4601 Economics I	4 QH	HST 4110 History of Civilization A	4 QH
Examines development of macroeconomic analysis, national income concepts, national income determination fluctuation and growth, role of the banking system and the Federal Reserve System, government expenditures and taxation, international trade, and balance of international payments.		Covers the major ideas and institutions of civilization from ancient times to 1648.	
ED 4001 Integrated Language Skills Development 1	2 QH	HST 4111 History of Civilization B	4 QH
Strives to improve a student's reading comprehension and related study and language skills. Devotes time, discussion, and considerable practice to meaning skills such as basic reading comprehension and interpretation, including work in critical reading and other interpretational acts (inferences, understanding imagery, and symbolic usage). Focuses on study skills, previewing, finding main ideas and details, outlining and summarizing, continuous interaction, and interaction of all the communications skills—reading, writing, listening, and speaking.		Continues HST 4110, covering the period since 1648.	
ED 4002 Integrated Language Skills Development 2	2 QH	MGT 4110 Survey of Business and Management	4 QH
Continues discussion of topics introduced in ED 4001. <i>Prereq.</i> ED 4001.		Offers an introduction to the setting and general structure of American business, the characteristics of private enterprise, and the nature and challenge of capitalism and other forms of economic enterprise. Discusses the forms of business, the structure of organization, and the functions of management in the context of their influence on the various forms of business. Through lecture and class discussion, the student gives an overview of the methodologies used in planning, organizing, directing, and controlling the functions of production, marketing, sales, pricing, and finance.	
ED 4003 Integrated Language Skills A	4 QH	MTH 1000 Mathematical Preliminaries 1	4 QH
Strives to improve a student's reading comprehension and related study and language skills. Devotes time, discussion, and considerable practice to meaning skills such as basic reading comprehension and interpretation, including work in critical reading and other interpretational acts (inferences, understanding imagery, and symbolic usage). Focuses on study skills, previewing, finding main ideas and details, outlining and summarizing, continuous interaction, and interaction of all the communications skills—reading, writing, listening, and speaking.		Reviews precollege mathematics, primarily arithmetic. Covers operations with numbers, fractions, decimals, percents, and graphs (pictographs, bar graphs, circle graphs, etc.), together with applications of these skills and concepts.	
ED 4004 Integrated Language Skills B	4 QH	MTH 1010 Mathematical Preliminaries 2	4 QH
Extends ED 4003, with continued emphasis on study skills, including researching, organizing, and writing term papers. Explores critical thinking as it relates to the learning process. Also addresses the choices of academic major and career direction, emphasizing self-assessment and personal decision making. <i>Prereq.</i> ED 4003.		Surveys precollege algebra, including signed numbers, exponents, multiplication of polynomials, factoring, linear equations, graphing, and radicals. For students whose background in algebra is weak.	
ED 4005 Integrated Language Skills Seminar	1 QH	MTH 1101 Basic Algebraic Applications	4 QH
Provides students with necessary information for the transition from freshman to sophomore status. Topics include personal, academic, and career goal setting, workplace market forces, selecting a major, and issues related to achieving sophomore status. Gives students the opportunity to explore a variety of career options both through library research and through interviews. <i>Prereq.</i> ED 4002 or ED 4004.		Examines systems of linear equations and their graphs. Focuses on graphic systems of linear inequalities in two variables that apply to linear programming. Introduces matrices, matrix multiplication, and vectors. <i>Students do not receive credit for MTH 1101 if they have already received credit for MTH 1113.</i>	
ENG 4013 Fundamentals of English 1	4 QH	MTH 1113 College Mathematics for Business	4 QH
Presents an intensive introduction to the principles of effective expository writing. Emphasizes description, paragraph construction, and organization. Reviews English usage, punctuation, and syntax. Includes essay assignments.		Examines sets, rectangular coordinates and graphs, functions and functional notation, linear and quadratic functions, exponential and logarithmic functions, systems of linear equations, summations, inequalities, permutations and combinations, elementary probability concepts, compound interest, and annuities.	
ENG 4014 Fundamentals of English 2	4 QH	POL 4106 Introduction to Politics	4 QH
Presents intensive instruction in exposition, argument, and academic essay writing and includes instruction in the writing of a research paper. Continues emphasis on English usage, punctuation, and syntax. Includes essay assignments.		Studies the basic political concepts and forces of organization from the classical Greeks to the modern nation-state. Contrasts the Soviet Union and the United Kingdom as contemporary illustrations of the institutional distinction between a totalitarian and a constitutional system.	
		SOC 4010 Principles of Sociology 1	4 QH
		Introduces basic concepts and theories relating to the study of humans as participants in group life. Emphasizes socialization, culture, social structure, primary groups, family, social stratification, and population.	
		SOC 4011 Principles of Sociology 2	4 QH
		Continues SOC 4010. Emphasizes critical analysis of American society, with attention to problems of social, political, urban, and industrial change.	

According to results of diagnostic tests, AEP students also enroll in dis-

English as a Second Language

ESL 1000 Core Structure and Communication**0 QH**

Provides explanations and practice to help students increase their fluency and accuracy in English communication. Includes labs and meetings with English-speaking peers from the University in addition to classwork.

ESL 1001 Grammar and Listening/Speaking**0 QH**

Targets problem areas of intermediate and advanced students. Some specific sections deal with grammar; others deal with listening and speaking skills.

ESL 1002 ESL Reading**0 QH**

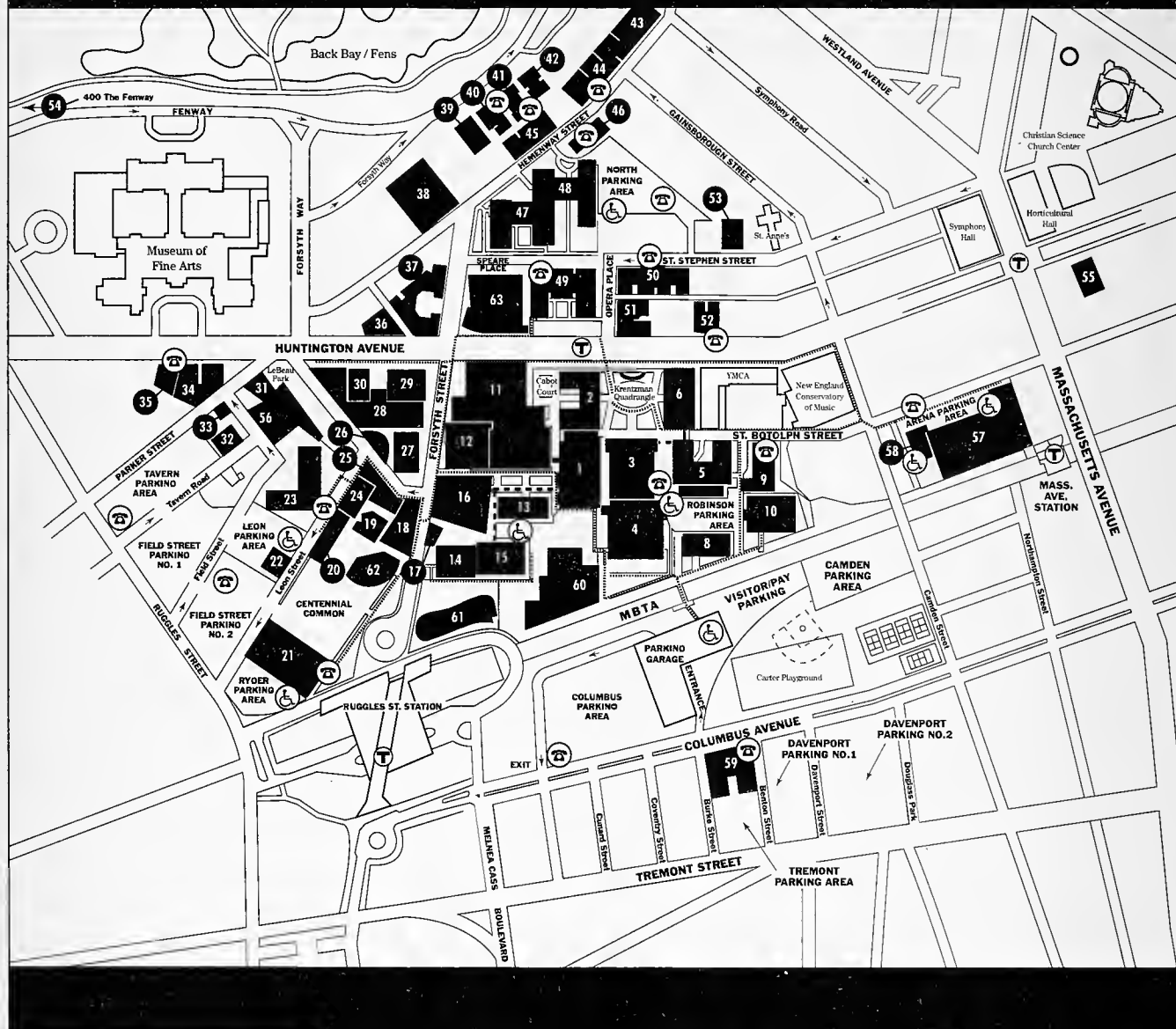
Provides guided practice in intensive and extensive reading. Uses materials including fiction, articles of general interest, and university-level textbook chapters. Offered at levels from beginner to advanced.

ESL 1003 ESL Composition**0 QH**

Provides intensive practice in writing. All levels focus on correct written expression. There is a gradual increase in attention to content and organization as proficiency levels go up.



Appendix



Academic and Service Buildings

22	Jahn D. D'Bryant African-American Institute (AF)	24	Holmes Hall (HO) TTY: Rm 276
12	Barletta Natatorium (BN)	55	236 Huntington Avenue (HU)
19	Boiler Plant	10	Hurtig Hall (HT)
11	Cabot Physical Education Building (CB) TTY: Rm 110	26	Kariotis Hall (KA)
39	Cahners Hall (CA) TTY: Rm 151	41	Kerr Hall (Faculty Center) (KH)
28	Cargill Hall (CG)	29	Knowles Center (KN)
13	Churchill Hall (CH)	25	Lake Hall (LA) TTY: Rm 203
62	Classroom Building (CL)	63	Roger M. and Michelle S. Marino Recreation Center
59	Columbus Place (716 Columbus Avenue) (CP)	57	Matthews Arena (MA)
9	Cullinane Hall (CN)	58	Matthews Arena Annex (MX)
40	Cushing Hall (CU)	20	Meserve Hall (ME) TTY: Rm 305
14	Dana Research Center (DA)	5	Mugar Life Science Building (Peabody Health Professions Center) (MU)
27	Dackser Hall (DK) TTY: Rm 107	18	Nightingale Hall (NI) TTY: Rm 125
6	Dodge Hall (DG)	31	Parker Building (PA)
61	Maureen and Richard J. Egan Engineering/Science Research Center	2	Richards Hall (RI) TTY: Rms 150, 254
3	Ell Student Building (Auditorium) (EL) TTY: Rms 04, 104	8	Robinson Hall (RB)
4	Ell Student Center (Student Lounge) (SC) TTY: Rm 255	21	Ryder Hall (RY) TTY: Rms 170, 180, 251, 270
56	Field Street (FS)	15	Snell Engineering Center (SN) TTY: Rm 120
16	Forsyth Building (FR) TTY: Rms 100, 135	60	Snell Library (SL) TTY: Reference Desk
17	Forsyth Building Annex (FA)	50	122 St. Stephen Street (SS)
38	Forsyth Dental Building (FE)	30	Stearns Center (ST) TTY: Rm 302
1	Hayden Hall (HA) TTY: Rms 120, 202	32	26 Tavern Road (TA)
33	Hillel-Frager (HF)		

Residence Buildings

34	Burstein Hall	45	Loftman Hall and 153 Hemenway Street
43	Kennedy Hall	42	Melvin Hall
46	142-14B Hemenway Street	35	Rubenstein Hall
45	153 Hemenway Street and Loftman Hall	44	Smith Hall
7	316 Huntington Avenue (Northeastern at the YMCA)	49	Speare Hall
52	319 Huntington Avenue	48	Stetson East TTY (public)
51	337 Huntington Avenue	47	Stetson West
36	407 Huntington Avenue	50	106/110/116/122 St. Stephen Street
41	Kerr Hall	23	Willis Hall
53	Light Hall	37	White Hall
		54	400 The Fenway

Key

Academic, residential,
and service buildings

Handicap parking

Accessible routes

Parking areas

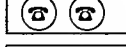
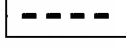
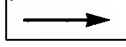
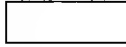
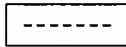
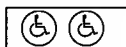
Street direction

Underground tunnel

Emergency telephone

TTY locations

See alphabetic list of buildings
for **TTY** locations.



Maps are provided by the Information Center, 115
Richards Hall, extension 2736 (TTY extension 3768).
Some buildings on this map are used but not owned
by Northeastern University. 5/96

Academic Calendar 1996–1997

1996

September	2	Monday	Labor Day. University closed.
	2–13	Monday–Friday	Divisions B and Z vacation.
	12	Thursday	Fall Commencement.
	13–17	Friday–Tuesday	Orientation and registration for freshmen and transfer students.
	16	Monday	Upperclass registration (Divisions B and Z) 1 PM.
	18	Wednesday	Classes begin in undergraduate full-time day programs.
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October	14	Monday	Columbus Day. University closed.
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November	11	Monday	Veterans Day. University closed.
	28	Thursday	Thanksgiving Day. University closed.
	28–30	Thursday–Saturday	Thanksgiving recess. University closed except key offices.
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December	6–12	Friday–Thursday	Fall final examinations for undergraduate full-time day programs.
	13–Jan. 1	Friday–Wednesday	Christmas vacation. University closed except key offices.

1997

January	1	Wednesday	New Year's Day. University closed.
	2–3	Thursday–Friday	Orientation and registration for new freshmen and transfer students; registration for continuing September freshmen and returning upperclass students (Divisions A and Y).
	6	Monday	Classes begin in undergraduate full-time day programs for winter quarter.
	20	Monday	Martin Luther King, Jr.'s Birthday observed. University closed.
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February	17	Monday	Presidents' Day. University operates on a normal class schedule.
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March	10–14	Monday–Friday	Winter final examinations for undergraduate full-time day programs.
	17–22	Monday–Saturday	Division A vacation.
	24–25	Monday–Tuesday	Orientation and registration for new freshmen and transfer students, continuing September and January freshmen, and returning upperclass students (all seniors and Divisions B and Y).
	26	Wednesday	Classes begin in undergraduate full-time day programs for spring quarter.
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April	21	Monday	Patriots' Day. University operates on a normal class schedule.
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May	26	Monday	Memorial Day. University closed.

June	2-6	Monday-Friday	Spring final examinations for undergraduate full-time day programs.
	9-13	Monday-Friday	Divisions B and Y vacation.
	14	Saturday	Commencement.
	16	Monday	Registration for Divisions A and Z and January freshmen (Quarter 3).
	17	Tuesday	Classes begin in undergraduate full-time day programs for summer quarter.
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July	4	Friday	Independence Day. University closed.
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August	25-28	Monday-Thursday	Summer final examinations for undergraduate full-time day programs.
	29-Sept. 14	Friday-Sunday	Divisions A and Z vacation.
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September	1	Monday	Labor Day. University closed.
	11	Thursday	Fall Commencement.
	11-16	Thursday-Tuesday	Beginning of 1997-1998 academic year. Orientation, advising, and registration continues for new students and returning Divisions A and Z.
	17	Wednesday	Classes begin in undergraduate full-time day programs for fall quarter.

Calendar dates are subject to change. The University community will be notified if such changes are necessary.

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Tuition Default Policy. In cases where the student defaults on his/her tuition, the student shall be liable for the outstanding tuition and all reasonable associated collection costs incurred by the University, including attorneys' fees.

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If a storm occurs at night, the announcement of University closing is given to the radio stations at approximately 6 AM. Classes are generally canceled for that entire day and evening at all campus locations unless stated otherwise. When a storm begins late in the day, cancellations of evening classes may be announced. This announcement is usually made between 2-3 PM.

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Ellen S. Jackson, Dean/Director
Office of Affirmative Action
175 Richards Hall
Northeastern University
Boston, Massachusetts 02115
617-373-2133

Inquiries concerning the application of nondiscrimination policies may also be referred to the Regional Director, Office for Civil Rights, U.S. Department of Education, J.W. McCormack Building, Post Office Court House, Room 222, Boston, Massachusetts 02109-4557.

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Mission Statement. Northeastern University is dedicated to providing a diverse student population with an academic program and a course of professional preparation of the highest quality. The University values equally knowledge for its own sake, knowledge as a means to success in the workplace, and knowledge as a cornerstone of personal achievement and satisfaction. As a private, urban university, Northeastern is determined to maintain its reputation as a friend to the city of Boston and a partner of the Commonwealth of Massachusetts.







